THE MEDICAL NEWS.

A WEEKLY JOURNAL OF MEDICAL SCIENCE.

VOL. LXXVII. NEW YORK, SATURDAY, JULY 14, 1900. No. 2.

ORIGINAL ARTICLES.

TENDON TRANSPLANTATION IN THE TREATMENT OF DEFORMITIES OF THE HAND.*

BY WISNER R. TOWNSEND, A.M., M.D.,

OF NEW YORK;

PROFESSOR OF ORTHOPEDIC SURGERY IN THE NEW YORK POLYCLINIC.

ALTHOUGH the operation of tendon transplantation was first proposed by Nicoladoni, in 1881, when he successfully attached both peronei to the tendo Achillis in a case of paralytic talipes calcaneus, it is only during the past five years that it has attracted much attention and become one of the recognized methods of treating paralytic deformities.

Many surgeons have reported their results in operations on the feet, but few cases are to be found in which the tendons have been transplanted for the relief of deformities of the hand. The relative infrequency of poliomyelitis of the upper extremities partly accounts for this discrepancy, but there are many patients suffering from drop-wrist, from distortion of the fingers and hand due to cerebral palsies of childhood or to poliomyelitis or cerebrospinal meningitis, whose deformities could be entirely done away with and who could have more or less complete restoration of function if this operation were done. Other conditions suitable for the procedure are contractures following cerebral lesions later in life, injuries to the nerves and subsequent paralyses of the muscles, deformities due to muscular action or instances of severed muscles where their power is lost and the cut ends cannot be found or cannot be reunited.

The term, tendon transplantation, is the one used by most authors, but others prefer to designate the operation as tendon grafting, tendon anastomosis, tendon suture, or function transference. In a review of the literature the following cases have been found:

Case I.—Bernhard[1]. Male, thirty-five years of age. Fell through a glass skylight and received a severe cut of the hand. Made a good recovery, except that stiffness and inability to flex the index finger remained. To relieve this an incision was made over this finger. The peripheral end of the sublimis could not be found. The flexor profundus was found cut close to the bone at the base of the first phalanx, its stump contracted within its fibrous canal; the central end could not be found. By splitting this fibrous canal the peripheral stump was freed and the profundus tendon was drawn out with an artery clamp and fastened to the extensor indicis, which was brought forward by making a tunnel at the metacarpal joint close to the bone. The tendons were united by making a slit in the profundus stump, drawing the extensor through it and then suturing both tendons together with silk. The external wound was closed, and the finger put in flexion. Both wounds healed *per primam*. Dressings were removed on the tenth day, and attempted movement of the finger reopened the skin. This, Bernard thinks, was due to preoperative trophic disturbances of the skin. The tendons, firmly united, could be seen through the skin opening. Operation proved successful in spite of this reopening, although the exact condition is not given.

Case II.—Franke[2]. Complete cerebral radial paralysis of the right hand, which was held in flexion and absolutely without function. Incision made on ulnar side of forearm. After the flexor carpi ulnaris had been divided, its central end was brought around and fastened to the peripheral end of the extensor carpi ulnaris which had also been cut across. The wound was closed and the hand fixed in hyperextension. Suture material used was catgut. On account of its early absorption the skin reopened, the tendons, however, remained perfectly united. To close the skin opening silk sutures were used. Wound healed *per primam*. Operation was unsuccessful in that there was only a minimum amount of extension afterward and the deformity soon returned.

In a second operation on the same individual, Franke decided upon transplanting the supinator brevis because there was a slight amount of supination present. On examination it was found so atrophied that the plan was abandoned. Instead, the tendon of the extensor carpi radialis longior was shortened; but, the surgeon not being satisfied, a third operation was done in order still further to shorten the tendon. This was followed by a complete motor paralysis of the forearm due to the fact that the Esmarch bandage was left on for several hours after the operation, but finally the arm was not only completely restored to its former position, but showed marked improvement of the radial paralysis. The hand was somewhat over extended and the motion was very good.

Case III.—Franke. Motor paralysis of the shoulder, arm, forearm and hand; an operation was done to improve the radial paralysis. The extensor carpi ulnaris was divided and the central ends sutured to the common extensor of the fingers at the point where it subdivides. Result fairly good.

Case IV.—Keiler[3]. Male, eighteen years of

* Read before the American Orthopedic Association, Washington, May 1, 1900.

age. Old hemiplegia, paralysis of the extensors of the hand. Function of the thumb and little fingers retained. Tendon of the extensor carpi radialis was sutured to the tendon of the extensor communis digitorum. Result fair.

Case V.—Kirsch[4]. Traumatic cut of the extensor brevis pollicis; the peripheral stump was united to the extensor carpi radialis longior. Result, recovery of the extension of the thumb. This operation was done with infiltration anesthesia.

Case VI.—Rochet[5]. Female, aged nine years. Deformity following poliomyelitis, paralysis of the abductors of the wrist and thumb. Operation consisted of an incision over the ulnar border of the forearm about eight centimeters in length extending down to the wrist. The flexor carpi ulnaris was divided near the pisiform bone and the extensor carpi radialis near its insertion; by dissecting back on the dorsal surface the extensor brevis pollicis and the abductor pollicis were freed and after their sheaths had been opened the central stump of the extensor carpi ulnaris was fastened to them. The hand was placed in radial abduction. A successful restoration of function resulted.

Case VII.—Rochet. Boy, aged fourteen years. Infantile paralysis of right arm and hand. The fingers were held firmly flexed, no extension possible, except in the ring finger and thumb. No adduction or abduction of the thumb, but the latter was held against the second metacarpal bone. A median incision was made on the back of the hand from the wrist to the middle of the forearm. Muscles were cut and an endeavor made to utilize the extensor power of the ring finger and thumb for the other fingers by suturing the following tendons by their lateral borders: (1) The tendon of the extensor brevis and abductor pollicis; (2) the extensor longus pollicis and the extensor indicis; (3) the tendons of the middle and little fingers to the tendons of the ring finger, thus endeavoring to make all the dorsal tendons act in groups of two or three. Three and one-half months after operation the little and index fingers could be voluntarily extended. The middle finger was unimproved, there was slight abduction of the thumb.

Case VIII.—Rochet. Male, aged fourteen years. Right plastic hemiplegia. Hand and fingers held flexed to an acute angle. Median incision on dorsal surface of the forearm above the wrist twelve centimeters long. The extensors of the fingers and the extensors of the wrist were divided six to seven centimeters above the joint. A median palmar incision was then made and, after dividing the superficial flexors, an opening was made in the interosseous space and the central stumps of the flexors were brought through and sutured to the peripheral stumps of the flexors. Five months after operation the hand was in line with the forearm, there was extension of the fingers with the exception of the thumb, which was only restored within moderate limits.

Case IX.—Roget[6]. Patient aged thirteen years; sex not given. Paralysis of the extensors and of the abductors of the right thumb. An anastomosis was made between the peripheral end of the long extensor tendon and the extensor of the index finger which was cut just above the upper edge of the "anatomical snuff-box." Result good. Patient could write and make movements impossible before, and when extension of the thumb was made, extension of the index finger occurred at the same time or *vice versa*.

Case X.—Mueller[6]. Male, had lost the use of the forearm as the result of a fracture of the humerus in which an unsuccessful operation had been done to free the callus after which tendon suture was resorted to. Prior to examination electrical examination showed reaction of degeneration, but the direct irritability of the extensors was not entirely lost. Two and one-quarter years later electric irritability of the muscles of the forearm supplied by the radial nerve was lost completely.

An incision six centimeters long was made on the ulnar side of the forearm above the wrist, the flexor carpi ulnaris exposed and cut close to its insertion and brought above the styloid process of the ulna to the dorsal side. All of the extensors of the fingers and the extensor carpi ulnaris were then cut and united with catgut to the flexor carpi ulnaris, the hand held in extension. Healing was delayed owing to some of the catgut ligatures. At the end of three months improvement was very slight, but, despite the fact that no further treatment was given, the function of the hand steadily improved until seven months after the operation the thumb could be extended, but not abducted, and motions of extension of the hand were possible. Three months later the strength of the hand had increased and the thumb and index fingers could be voluntarily extended separately and in connection with the other fingers. The one difficulty was that in extending the hand was pulled to the ulnar side. To improve this and also replace the abductor pollicis the following operation was done:

The flexor carpi radialis was freed but not cut; its lateral edges were freshened and united to the tendons of the abductor pollicis and the extensor carpi radialis longior. The hand was held extended and turned toward the radial side. Improvement was noticed within six weeks after the operation. The thumb could be abducted by the action of the flexor carpi radialis longior which turned the hand toward the radial side, a condition which was afterward entirely overcome. Several months after the operation the patient could extend the fingers and was able to use the hand for various purposes.

Cases XI. and XII.—Tubby[7]. An incision three inches in length is made in the middle of the forearm as for ligature of the radial artery. The inner edge of the supinator longus is rapidly defined, and beneath it the radial artery and nerve. The latter structures are drawn inward and the distal part of the pronator radii teres is separated from the surrounding muscles and fas-

cia. Its tendon is then removed from the radial attachment, care being taken not to remove the periosteum. The pronator radii teres is then held aside and an opening is made into the interosseous membrane just internal to the inner border of the flexor longus pollicis. An aneurism-needle is then passed behind the radius from without inward and as close to the bone as possible; a sufficient space is made for the passage of the tendon of the pronator radii teres, and the aneurism-needle is left with its eye towards the ulna. The tendon of the pronator radii teres is then transfixed with silk of medium thickness, in the form of a Staffordshire knot leaving two free ends. The ends are passed through the eye of the aneurism-needle, and by traction on it the tendon of the pronator radii teres is brought around the radius. The ends are now utilized in the following way so as to secure the tendon to the bone. They are rethreaded on separate suture needles and the tendon is grafted thus to the periosteum. One suture is passed through the periosteum on the outer side of the radius above the transplanted tendon and the other passes through below. The two ends are then knotted together over the tendon. But I am disposed to think that it is better to work a drill through the bone from before backward and near the outer surface and then secure the ends through the aperture. This completes the first part of the operation.

The second part consists in dividing the tendons at the wrist. A transverse incision is made there, the median nerve is defined and protected, and the following tendons are divided; the flexor carpi radialis, the flexor sublimis, palmaris longus, flexor carpi ulnaris, and, if the thumb is strongly flexed and adducted, the flexor longus pollicis. Both wounds are then closed and dressed and the limb is put up with the elbow extended, the forearm supinated, and with wrist well flexed for eight days. From this time onward till the sixth week the angle of flexion at the wrist is gradually diminished until it is in a straight position. Here the limb should be maintained while the extensors and supinators are massaged and stimulated with interrupted current, care being taken to control the limb with a splint reaching from the upper arm to the fingers. The arm recovers its use very rapidly indeed.

I have now practised this operation in two cases with great success, and I find that in three months after the operation the patients could use the hands well and perform such fine movements as picking up a pin. If there is any hesitation on a child's part in using the limb it is well to tie up the sound arm and insist that he use the limb recently operated on.

I desire to place on record three cases that I have personally operated on and, through the courtesy of Drs. Whitman and Gibney, to add two others.

Case XIII.—Male, aged seven years, admitted to the Hospital for Ruptured and Crippled, December 15, 1899, suffering from right hemiplegia, pes equinus, and drop-wrist. When sixteen months old had cerebrospinal meningitis, followed by paralysis of the entire right side, including face muscles, and also was unable to speak. He has had convulsions since then almost daily (*petit mal*). Before the meningitis the boy was bright, but now shows marked signs of mental deficiency. The foot is held in marked equinus with slight varus. The right arm is one and one-half inches shorter than the left. There is slight power in the extensor communis digitorum. The wrist is held at nearly a right angle with the forearm, and the flexor muscles of the wrist act; the flexion at the elbow is fair, although extension is limited to 130 degrees. The deltoid is atrophied and there is slight atrophy of the supra- and infraspinatus.

December 12th, operation on the foot by Dr. Whitman and the deformity perfectly corrected; plaster-of-Paris dressing applied. January 9th operation on the wrist by Dr. Townsend; incision 2 inches long was made over the dorsal aspect of the wrist just above the annular ligament. The extensor communis digitorus tendon was shortened as much as possible by overlapping; fastened with silk sutures; superficial wound closed with catgut. February 10th, dressing removed. Union *per primam*. The hand held in good position. The tendency to drop-wrist has been overcome, but the voluntary power has not been appreciably restored; part of this may be due to the fact that the boy cerebrates so slowly that it is impossible to get him to do anything. A brace is applied to hold the hand strongly extended. April 25, 1900, condition unchanged.

Case XIV.—Male, fourteen years of age. Referred by Dr. Sachs. Right hemiplegia, due to cerebral palsy of infancy. Instruments were used at the time of birth, but no damage apparently was done to the exterior of the skull. The patient has had treatment by electricity and massage and some years ago had his heel cord cut.

Fig. 1.

Case XIV.—Maximum Extension Before Operation.

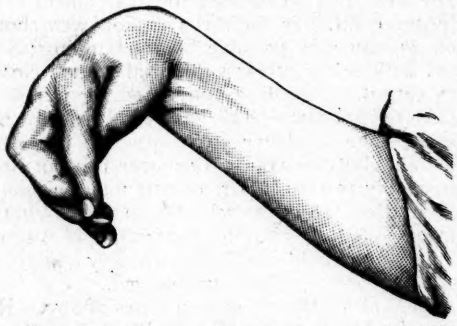
Has never been able to use the right hand and it is held in a typical position of claw-hand, it being sharply flexed at the wrist and the fingers flexed on the palm of the hand; the back of the hand is held nearly at a right angle to the forearm. By a voluntary movement he can extend the fingers slightly, but cannot extend the wrist.

Electrical examination of the right arm, De-

cember 20th, by Dr. Schlapp: Supinator longus, reaction slight, not enough to overcome the contraction of the pronators. Extensor carpi radialis longior et brevior, extensor carpi ulnaris and extensor of the thumb, no reaction. Extensor communis digitorum, no reaction to the electrical current; seems to react very slightly to impulse of the will. Flexors do not act as well as normal muscles, perhaps due to contracted condition. Flexor carpi radialis and flexor carpi ulnaris react. Flexor sublimis digitorum reacts but not completely. The anterior pair of its four tendons seems to react slightly. The posterior pair very slightly. Flexor profundus digitorum does not give a perfect reaction. The extensor muscles do not react when the nerve is excited. The flexor muscles do as a group.

It is difficult to get reaction of separate or single muscles, because a strong current is necessary to get any reaction, and then the reaction of individual muscles is marked. The circumfer-

Fig. 2.



Case XIV.—Maximum Flexion Before Operation.

ence of the right hand is one inch less than that of the left.

December 21st.—At the Polyclinic Hospital, under ether anesthesia, Esmarch bandage at elbow, the forearm and wrist having been cleansed thoroughly with green soap and bichloride dressing, all hair having been removed by shaving, an incision was made in the middle of the flexor surface over the wrist exposing the tendons. The flexor carpi radialis, the flexor carpi ulnaris and the palmaris longus were divided by scissors just above the annular ligament. Silk was stitched to each tendon and each fastened to an artery clamp, so that they should not draw up out of reach. The parts were then covered with sterile gauze, and the hand turned over and an incision made on the dorsum of the wrist; the extensor communis digitorum was exposed about one and one-half inches above the joint, the tendon being pulled to one side; dissection was made through the upper edge of the pronator quadratus and between the bones to connect with the flexors previously cut. These tendons were then slipped through, and to the extensor communis was attached the three flexor tendons previously mentioned. The lengthened extensor communis digitorum was folded on itself twice, so as to shorten it and between these folds the flexor tendons were stitched. The sewing was done with catgut. The wounds were then closed with catgut and dry dressings applied. The hand was placed in a hyperextended position and a plaster-of-Paris bandage applied. The wounds healed *per primam*, with the exception of one little spot on the

Fig. 3.

Case XIV.—Flexion After Operation.

flexor side where a suture pulled out, which granulated over and closed inside of ten days. All dressings were removed at the end of that time, the arm bandaged and placed in a splint, with a pad of gauze under the hand to keep it and the fingers in extension.

The splint, etc., were removed at the end of six weeks, and the patient has simply carried his hand in a sling since then. The reason for so long delaying the removal of the dressings was to insure, as far as possible, perfect union of the sutured tendons. The hand is held perfectly straight in line with the forearm. The patient has power to extend and flex. He has fair grasp of the fingers; had none before, owing to the position in which the hand was held. When the electrical current is applied to the flexor carpi radialis, it is seen that a contraction occurs under

Fig. 4.

Case XIV.—Extension After Operation.

the scar, on the dorsal surface of the forearm. In addition, the electrical current applied to the extensors gives better reaction than it did before the operation, owing to better position of the hand. Flexion and extension can be carried through an arc of about 20 degrees and I expect this to be much increased by use, massage and electricity. April 29th, condition of the hand

much improved, is able to hold a pen and write his name in a legible way, can pick up objects with his fingers. Flexion of the fingers is increasing, and extension of the hand can be carried further than at the last examination. The hand is held in perfect position and there is marked increase in strength and better circulation; can flex fingers without thumb getting in the way, as it formerly did. Fig. 1 shows the greatest amount of flexion before operation; Fig. 2, the greatest amount of extension; Fig. 3, the greatest amount of flexion after operation; Fig. 4, the greatest amount of extension after operation.

Case XV.—Male, aged fourteen years, referred

Fig. 5.

Case XV.—Position of Hand Before Operation.

by Dr. Leszynsky. Admitted to Polyclinic Hospital, April 5, 1900. Right hemiplegia due to infantile cerebral palsy. The patient had a marked drop-wrist, the latter being held at an angle of about 90 degrees to the forearm, and the fingers flexed, contracted and firmly held in

Fig. 6.

Case XV.—In Splint.

the palm of the hand. Electrical examination made by Dr. Schlapp. No contraction of the extensor muscles of the forearm, either to faradism or galvanism, even when irritation was applied to the musculo-spiral nerve. The triceps contraction was perfect. The flexor carpi ulnaris and the flexor communis digitorum both reacted perfectly to faradism; the flexor carpi radialis reacted, but in an imperfect degree. Position of the hand is shown in Fig. 5. The boy had no power to flex or extend the hand; slight power of flexion in the fingers.

April 5th, under ether anesthesia, the forearm having been thoroughly scrubbed and cleansed with soap poultice over night and washed with bichloride before operation, an incision was made 3 inches long on the radial side of the forearm, on the edge of the arm midway between the dorsal and palmar surfaces. The lower portion of the incision reached to the wrist; the skin was dissected backward, and the flexor carpi radialis and

Fig. 7.

Case XV.—After Operation, Weight Partly Supported.

the palmaris longus were divided as close to the annular ligament as possible, and then dissected upward for a distance of about 3 inches. Dissection having been carried in the opposite direction to the back of the forearm, an attempt was made to fasten these tendons to the extensor communis digitorum. Just as they were being sewed in the slit of the atrophied tendon the latter tore through in such a manner that it was not possible to attach them. Therefore, the deep extensor was drawn upward, a slit made through it, both tendons drawn through, and then, at a point ¼ of an inch above, drawn through again, having previously been scarified.

The wrist at the time was held in a position of extreme extension and the tendons were pulled down and fastened to the extensor tendon as near to the wrist as possible. The tendons were fastened with kangaroo-tendon and the skin-wound sewed with catgut in a continuous suture. The operation was much delayed by oozing, as the Esmarch bandage was not used. Sterilized dressings of dry gauze were applied, and the arm put up in a hyperextended position, and held there

Fig. 8.

Case XV.—Position of Hand After Operation.

by plaster of Paris. The highest temperature was reached the day after the operation, when it rose to 100° F., never going above 99° F. after that. The patient did not suffer pain, but there was marked swelling of the fingers for the first few days, although the color was always good and they were never cold. Dressings were re-

moved April 21st. Wound healed *per primam*, except for two small spots about the middle of the incision, in which the skin at the edge of the incision was dry, but black and necrosed, evidently due to pressure of the artery forceps which were used to grasp the skin in one instance where we desired to retract. Dressing of balsam of Peru applied and the arm placed on a board-splint, with a roller bandage under the hand to keep up the hyperextension, and the patient allowed to carry the arm in a sling. April 26th, the patient still has very slight swelling of the fingers and wrist. Color, temperature, and sensation normal. The dressings removed again today, the two necrosed spots still present, and have not yet separated from the tissue beneath. They are ¼ inch in length by ½ inch. Remainder of healing perfect. No attempt was made at motion of the wrist or fingers. Present position of the hand and arm on the splint is shown in Fig. 6. Fig. 7 gives the position with fingers lightly resting on string, as it is not desirable to have any effort to contract sutured tendons made. Fig. 8 shows the greatest voluntary flexion.

Case XVI.—Gibney. Male, four years of age, admitted to the Hospital for Ruptured and Crippled, January 11, 1900, for right hemiplegia, equinus and drop-wrist. Seven months ago the child had convulsions of the right side, including face, arm and leg. This lasted one month. His hand and arm became paralyzed and flexed; toe-drop still continues. There is great weakness in muscles of the arm and hand. Was taken to a dispensary and electricity applied. January 13th, right foot held in position of equinus. Able to extend it to 90 degrees, due to action of common extensor and tibialis anticus; flexor muscles good. Wrist held at an angle of 90 degrees to forearm. The sublimis digitorum has good power. Fair power in the extensor communis. January 16th, operation by Dr. Gibney. Incision 2 inches long over the extensor aspect of the wrist. Common extensor tendon exposed and loop taken in it, also one in the extensor longus digitorum and extensor longus pollicis. Sutured with No. 3 silk. Hand put up in hyperextension. February 10th, plaster removed from hand. No power of extension in wrist. Can extend fingers fairly well. March 31st, power in wrist has but very slightly improved, although the position is better.

Case XVII.—Whitman. Male, twelve years of age, admitted to Hospital for Ruptured and Crippled, August 4, 1899. When two years old the father noticed that the child's right side was partially paralyzed, but he never received any treatment. Examination August 5th showed that the child had right hemiplegia with drop-wrist and inability to extend the hand; also slight hemi-atrophy of the right side of the face. Marked atrophy and weakness of the right arm and hand. September 12th, under gas and ether anesthesia, an incision 2 inches long was made over the dorsal surface of the wrist; the extensor carpi radialis longior and brevior were cut and shortened as much as possible. The divided ends of the tendons were sutured together by means of silk. Wound closed with catgut, hand put up in hyperextension. Wound healed *per primam*. October 17th, incision on dorsal aspect of wrist, 2 inches long, over outer extremity of the right ulna and extensor carpi ulnaris was exposed and shortened as much as possible. To this shortened tendon was then fastened the flexor carpi ulnaris which had previously been divided. Hand put up in hyperextension. Wound healed *per primam*. April 27, 1900. Result is excellent. Patient is able to flex the fingers, flex and extend the wrist; although the hand is smaller than its fellow, it is very useful.

Vulpius[8] reports a case in which the flexor carpi radialis was made to perform the function of a flexor of the fingers. Several other cases are reported, but the details given are so scanty that it is not considered advisable to insert them. Vulpius[9] mentions in another paper that he has operated on three cases, but does not give the details. Hoffa[10] also reports three cases and gives full details.

The reports of these cases show clearly that we have at our command an operation which will do away with the necessity of physicians telling their patients that the best thing to do for a case of drop-wrist following a cerebrospinal meningitis is to amputate the arm, and that many patients who have heretofore been told that nothing could be done for their relief can be markedly relieved. The necessity for careful and thorough examination as to the condition of the various muscles prior to operation is a matter of considerable importance. We should ascertain whether they react to faradism and whether the reaction of degeneration is present or not. To get good results with restoration of function, it is advisable to suture only tendons that have power left; that is, if we expect these tendons to do any active work in the future. Of course, the tendon to which they are sutured is usually a paralyzed one, and the method of action is that the non-paralyzed shall do the work of the paralyzed one. Careful study of the various movements produced by the action of the muscles will tell us which tendons to transplant and to which they can be best attached. In addition, there is no reason why muscles should not be made to do work for which they were never intended, and by certain arrangements so fastened that their usual line of action shall differ from the normal. In rare instances a paralyzed muscle might be transplanted, the idea being simply to use it to hold the hand or fingers in a better position without any expectation of restoration of function. Asepsis, of course, is very necessary and if we have union *per primam* there should be no adhesions to interfere with the movements of the muscles. To close up thoroughly the tendon sheaths is very difficult and probably unnecessary. Several small incisions are better than extensive dissections.

The question as to the proper material to use

in suturing tendons seems to be of some importance, but all kinds of suture material have been used with success. Most operators use silk for the reason that it is less liable to be absorbed, more liable to hold, and easier to use. I personally have used silk, catgut, kangaroo-tendon and silkwormgut, and in every one of these cases perfect union has resulted. The skin wounds have all been closed with catgut, but this material, on account of its rapid absorption, is not recommended for fastening together the tendons.

The question whether to cut the muscles across entirely in shortening them is one that has usually been decided in the affirmative, but personally I prefer to lap the tendon so that in case of nonunion we still have the original tendon left instead of a wide gap between the divided ends.

The method recommended of fastening the two tendons together is that of Goldthwait[11]; "The tendon to which the attachment is to be made is split and the end of the severed tendon, after it has been scored across to make the surface rough, is drawn through this slit and held by two quilted sutures. In this way both sides of the severed tendons become attached; and to offer a still greater area for adhesion the sutures are so placed that when tightened the outer tendon is spread out. The outermost suture is passed through both tendons and tied. The other is passed through the outer portion of the split tendon, then through the free tendon from an eighth to a quarter of an inch away from the edge of the first tendon, then through the posterior portion of the split tendon and then back in the same way. When this suture is tied it spreads the outer tendon."

In the last case operated on I not only passed the tendons through one slit in the other muscle, but, one and one-half inches below, passed it again through another, thus making two points of attachment. Sharpening or freshening the edges of the tendon that is to be slipped through is always advisable, and the slitting of the other tendon makes a raw surface with which it will unite. In Case XIV. the ends of the cut tendons were fastened between and to the other tendon which had been folded back on itself for the purpose of shortening it.

Whether the dressings should be removed immediately after the operation is questionable. Even if they are removed I believe that the hand should be held in a hyperextended position for at least six weeks, so as to permit a perfect tendon union, for the skin union must be more rapid than that of the deeper parts, and it is very important that the tendons sutured shall not be pulled apart. In my cases no motion has been permitted until six weeks after the operation and then motions were begun gradually; electricity and massage were used. Indeed, upon the subsequent attention paid the case the ultimate result will largely depend. We may operate successfully and yet if we leave the case at this point we have but half done our work, for the reason that the muscles must be educated in their new sphere of action and must be stimulated as far as possible.

Most of the operations so far done have consisted simply in dividing tendons that were too strongly contracted and fastening them to other tendons which were too long or paralyzed. Future operators, I believe, will somewhat modify this procedure. It is very essential that the tendons which are too long should be shortened before the paralyzed tendons are fastened to them. But I believe that our procedure in regard to the cutting of the tendons which produce the deformity will differ somewhat from what it has been. There is no reason why we should entirely destroy the utility of these tendons by cutting them loose from their attachments, because there are various methods of lengthening them,[12] and a tendon which sharply contracted, if lengthened, might still continue to act and a portion of its power might be given to another which does not properly act. In many of these cases the contractures are active and yet the muscles on both the dorsal and palmar surfaces of the wrist will act to faradism and voluntarily contract, but the hand is held so flexed that the power of the extensors is *nil*. Yet, if we divide entirely the flexors of the wrist, our future wrist flexion is done away with and can only occur secondarily after the fingers have contracted by the action of the deep flexors. In these cases it seems to me that it would be desirable to save at least one or more of the flexors. Whether the operative procedure will be to slip the tendons around the side of the forearm and fasten them together, or to pass them through the interosseous space, as has been done in one case reported by Rochet and in one of my cases,* can hardly be decided until more work has been done, but the slipping through the interosseous space is not difficult and is worthy of trial. Numerous points of this kind will only be decided by actual experience in a larger number of cases than are so far to be found in the literature.

The question of the future action of the muscle, that is, so far as the cerebral action is concerned, is an interesting one and will be solved undoubtedly by the neurologist or physiologist. The practical point is that, with the flexor tendons attached to the extensors, when the patient wishes to extend the hand, the cases already operated upon show that the proper motion results, although the extension is accomplished by contraction of flexor muscles.

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* At the time of the operation I was not aware that it had been done before, not having seen Rochet's article until three months later.

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SOME REMARKS ON THE ARTIFICIAL FEEDING OF INFANTS AND THE REGULATION OF THE MILK-SUPPLY IN THE COUNTRY.[1]

BY J. FINLEY BELL, M.D.,
OF EAST HAMPTON, L. I., N. Y.

IN no branch of medicine or surgery has there been expended more patient laboratory work, research and clinical observation, than in pediatrics; and in pediatrics no subject has been productive of a greater effort or a more voluminous literature during late years than the study of nutrition and its disorders. This has been rendered imperative by the constantly-increasing number of infants nourished by artificial means. On the one hand we have the results of patient laboratory work from a purely scientific standpoint; on the other, the almost limitless array of proprietary foods in which commercialism holds more or less complete sway.

This is not surprising when we consider the immense importance of a proper artificial diet, the dire consequences of an improper one, and the complexity which is involved in the production of a proper food as adapted to individual cases. It must be noted that this work has been done by the comparatively few, by far the larger quota of the profession standing by showing scarcely interest enough to be regarded as awaiting results. The reasons for this attitude on the part of the majority are manifold, but the chief ones are, first, the inaptitude of many otherwise thorough and competent men for pediatric practice; and, second, the ever-ready refuge offered by proprietary foods and canned milks, to which they rush, first trying one and then another, until by good fortune a suitable dilution or a partial adjustment of the elements has been unconsciously found on which the child can live and perhaps thrive. Very frequently this good fortune does not obtain. While one food rapidly replaces another in the most aimless and empirical way the child perishes; whereas, a competent observance of the cause of the malnutrition by an inquiring and painstaking investigation, together with a thorough knowledge of the methods of modification in its present state of perfection, would save valuable time and thereby many lives.

In order to be successful in the artificial feeding of infants it is necessary to be thoroughly acquainted with the anatomy and physiology of the infantile digestive system under normal conditions, *i. e.*, the capacity of the stomach, the length of time required for digestion, the manner in which the various elements of the food are disposed of—all are necessary to a complete understanding of infantile dietetics. We must have a thorough chemical and physical knowledge of the substitute food, the amount and character of the different elements, and a rational method of arranging and combining them, so that the natural food will be approximated. This constitutes the modern modification of milk and marks the first real advance in infantile dietetics.

The first modified-milk mixtures were those of Meigs, whose modification was based approximately on an analysis of mother's milk, *viz.*: Fat, 4.00 per cent.; sugar, 7.00 per cent.; proteid, 1.5 per cent.; ash, .15 per cent. (analysis by Leeds). It was recommended that this be diluted in case it disagreed with the child. But this was faulty in that the individual digestive powers of the infant were not considered nor the variability of the different constituents of cow's milk taken into consideration.. The proprietary foods hold out the inducement that they are already modified to suit the needs of the infant. No doubt they are carefully prepared and are the result of much well-directed study. However, almost all of them contain starch or carbohydrates in excess, and as the saliva and pancreatic juice cannot digest starches before the fifth or sixth month, their continued administration will eventually cause intestinal fermentation. Some of these foods serve a useful purpose in making mixtures of partially dextrinized starch and modified milk, which, under certain conditions, are admissible and even advisable. The dextrinized foods intended to be used without milk, in the hands of the writer, have always been disappointing. Some of them claim an analysis closely approximating mother's milk, such, for instance, as Eskay's Albumenized Food, the formula of which is said to be: Fat, 4.16 per cent.; proteid, 1.76 per cent.; total solids, 11.33 per cent. They succeed for a time in a limited number of cases, but, if continued for several months, malnutrition more or less severe will almost certainly ensue.

Condensed milk is perhaps the most universally popular article of substitute food, and is by all odds the most pernicious. It is responsible for more malnutrition, gastro-enteritis, rhachitis, and infantile anemia than all other articles combined. Holt states that after six years of critical observation he has yet to see an infant, fed solely on canned or condensed milk, who did not exhibit the signs of rhachitis to a greater or less degree. They may on casual examination seem like healthy infants, for they are frequently fat. However, a careful inspection will disclose a rhachitic rosary, delayed and irregular dentition, frontal prominences, lusterless hair, dry skin; and, in one case, a very fat baby which came under the writer's notice, craniotabes was present to a marked degree. It should be noted that infants fatted on foods rich in carbohydrates lose their fat rapidly and have little resistance during acute illnesses.

[1] Read at the Seventh Annual Meeting of the Associated Physicians and Surgeons of Long Island, held at Northport, June 6, 1900.

The analysis of condensed milk containing sugar (by Leeds) gives: Fat, 12.10 per cent.; albuminoids, 16.7 per cent.; sugar, 38.88 per cent.; ash, 2.66 per cent.; making a total solid of 69.66 per cent. Diluted with eight times its weight in water will give: Fat, 1.51 per cent.; albuminoids, 2.01 per cent.; sugar, 4.86 per cent.; ash, .32 per cent.; a total solid of 8.7 per cent., water 91.31 per cent. As compared with mother's milk, as analyzed by the same chemist (Leeds), the above will show a deficiency of fat of 2.49 per cent., an excess of proteid of .51 per cent., and a deficiency of sugar of 3.14 per cent. If less water is used, the proteids, which are high with this dilution of one to eight, will be further increased and result in the passage of stools containing lumps of undigested casein. The Anglo-Swiss and the American-Swiss brands of canned milks, preserved without sugar, and with any rational dilution will give deficient fats, excessive proteids and deficient sugar.

Therefore, condensed milk, let it be ever so pure and carefully prepared, is not a suitable substitute for mother's milk. To meet the indications rationally, we must select some substitute which contains all the elements of mother's milk and is susceptible of such modification as will suit the needs and digestibility of the infant, taking human breast-milk as a standard. It has been found that cow's milk furnishes the elements in a form available for such modification as is required.

To properly modify milk for infant feeding, it is well to bear in mind that these elements differ, not only in their proportions as compared with mother's milk, but the elements themselves differ both chemically and physically. The reaction of cow's milk is either neutral or faintly acid, and mother's milk always alkaline. The degree of acidity of the cow's milk varies with the kind of food which she is receiving, some of the grasses producing a neutral or even an alkaline milk, notably the blue grass of Kentucky, the grasses indigenous to the islands of the St. Lawrence River and Lake Ontario, and most of the clovers. The fat of cow's milk is in larger globules and more difficult of digestion and has a higher refractive index. The proteids differ in coagulability and digestibility as well as chemically. This chemical difference is not well understood, but Siegfried and Wilmaack have found a diminution of nuclein in cow's milk; human milk containing 1 per cent. to 1.3 per cent. grams to the liter, while cow's milk contains only .6 per cent. grams to the liter.

If the composition of mother's milk is to be a guide in artificial feeding, a grave error has been committed in the administration of proteids. The Adriances, in an examination of two hundred specimens of human breast-milk show that the proteids constantly diminish during lactation, diminishing very rapidly during the first two days, not so rapidly during the next twenty days, and then very slowly to the end of lactation. The rule has been to begin with low proteids, say, .75 per cent. during the first week, and increase gradually to about 2.25 per cent. at the sixth month. It is very probable that infants during the course of their lactation would assimilate more of the proteids from cow's milk with a closer observance of the diminution of proteids as noted in human lactation. This condition was noted by Pfeiffer, Koenig, Klemm and others. Holt mentions it on the authority of Koenig, but ignores it in his modification of cow's milk to infant feeding. This point has been plainly noted by Zahorsky in his article, "A Critical Study of Infant Feeding Based on Recent Analyses of Human Milk," published in *Pediatrics*, Vol. V., 1898. He quotes Schlossman in support of the view that babies from four to eight months on high proteids show an increased mortality. This is at a period in the child's life, when, according to the "gradually-increasing method" the lines cross, the proteids becoming excessive at a time when they should be diminishing.

During last season the writer had occasion to test this theory clinically in two cases, and found tnat they rapidly improved after cutting the proteid from 1.5 per cent. to .75 per cent., then gradually working up to 1 per cent. and finally to 1.25 per cent., when the return of casein curds in the stools necessitated a reduction to 1 per cent., on which they thrived until weaning. The fact is that after a serious gastro-intestinal lesion, perhaps caused by an excess of proteid, it will be months before the same amount of proteid can be tolerated, as if the lesion had not occurred. When proteids are not well borne by the infant, and it becomes necessary to reduce the percentage very low, they will sometimes thrive on whey mixtures. Whey has the following composition, according to Koenig: Proteid, .86 per cent.; fat, .32 per cent.; sugar, 5.00 per cent.; salts, .65 per cent.; the proteids consisting largely of lactoglobulin and lactalbumin.

Now, the carbohydrates also differ chemically and physically. In human milk there are probably two sugars, a crystalline and an amorphous. Zahorsky notes that sugar from human milk crystallizes in rhomboid plates and sugar in cow's milk in wedge-shaped plates. In human milk the carbohydrates constantly increase during lactation and this should be noted in modification of cow's milk.

The above are some of the inherent difficulties found in the adaptation of cow's milk to infant feeding, which are in part compensated by a proper modification, so much so, that every infant free from congenital weakness or disease can be made to thrive, if the indications governing the modification are complied with. From observation it seems that the proprietary foods are used as extensively or even more extensively in the country districts than in the cities, and condensed milk of various brands is very popular with the laity and receives considerable support from the profession. This is a condition which, in the light of the results obtained by our city brethren in modification of cow's milk, shows a

decided lack of interest on the part of the country practitioner; and these results, too, obtained under all the adverse conditions consequent on a lack of supervision in the production and transportation, during which time it is liable to contamination from various sources. The city doctor has given us data and methods for modification, and it now behooves the country doctor to use his influence and advantage toward the reversal of the more or less filthy methods employed in most dairies at the present time.

Holt and Rotch in their text-books give excellent methods for modification, but recently exact formulæ have been derived, giving more accurate results. There have been a number of formulæ published for the modification of milk for infant feeding. Westcott's formulæ, I believe, first appeared, then Coit's decimal system, then Baner's formulæ and later Taylor's. Of these formulæ, that of Baner is the simplest and most popular. It is founded on two propositions: (1) The proteids and fat are practically equal in whole milk, being about 4 per cent. of each; and (2) the cream must be thought of as a whole milk plus a certain percentage of fat. According to Baner's formula, in order to estimate the quantity of cream required in a certain mixture, you divide the total quantity by the extra fat and multiply by the difference between the desired percentage of fat and the desired percentage of proteids. To estimate the quantity of milk, you multiply the total quantity by the desired percentage of proteids and divide by the percentage of fats. To estimate the quantity of water, you subtract from the total quantity the sum of the cream and milk.

Coit's decimal method is simpler arithmetic, but requires a number of standard cream mixtures which will be difficult to obtain, besides the metric system is not well understood by the laity. Taylor's formulæ were suggested to meet a shortcoming in Baner's method. Given a milk overrich in fat, for instance, eight per cent., the modification by Baner's formulæ would give far too much fat. However, milk overrich in fat will not be suitable for infant feeding, because, not being a well-balanced milk, it will probably have other inherent shortcomings.

The most serious problem confronting the pediatrist to-day is the universal difficulty of securing a pure cow's milk for suitable modification. Even before it leaves the milk-duct of the cow it is liable to contamination, and this liability increases with every manipulation until it is prepared and fed to the infant. This brings us to a consideration of certified milk, which is the second part of the paper. The first efforts in this direction were made in the city of Newark seven years ago and were the result of an agitation begun in 1889 by Dr. Coit, a leading pediatrist of that city. He brought the matter to the attention of the Practitioner's Club of Newark, and it resulted in the appointment of a committee to secure a better milk-supply. After considerable effort a dairyman of superior intelligence was found who was willing to attempt the experiment. A veterinarian, a chemist, and a bacteriologist were appointed, and, after certain exactions were satisfied, the milk received the certificate of this committee. Several producers, as soon as the experiment promised success, attempted to imitate the methods of this dairy, but their results fell far short of the standard, thus exemplifying the necessity for intelligent and trained supervision.

Soon after, a committee of physicians in the city of Buffalo, following closely the methods of Dr. Coit, furnished a certified milk. They had the entire supervision of the dairy, including the feeding and caring of the herd, the straining, aerating, cooling and bottling of the milk. The committee required a percentage of fats of 4.5 per cent., and the number of bacteria to be below ten thousand per cubic centimeter. In the milk ordinarily supplied to the city there were from 125,600 to 1,000,000 bacteria per cubic centimeter. The next city to adopt a method for certified milk was Rochester, which was done under the supervision of the Board of Health. This Board contracted with one of the most reliable dairymen to furnish them a milk for the season of a certain standard of fat and a bacteria limit. The product soon became unsatisfactory, when an inspection of the dairy revealed an almost absolute return to the careless methods obtaining in most dairies. A contract was then made with another dairyman, noted for his intelligence and honor, but this, too, proved a failure. They finally concluded that the only sure method to obtain a good milk for infant feeding was to rent the cows, barn and pasture for the season, and produce their own milk.

It is obvious, therefore, that there is something radically wrong in the methods heretofore pursued for the production of a suitable milk for infant feeding. A reform of this kind should begin first with the cow, then the dairyman, and next the distributor. It should be determined that the cows are healthy, preferably the native or Holstein breeds; they should be well fed on nutritive grasses in the summer, with a grain ration of at least ten pounds per day, and in the winter on good hay, meal and sugar beets. The writer finds that milk from cows fed on green corn during the autumn almost universally produces diarrhea in infants, and that cows themselves while on this food have diarrhea, and after feeding for several weeks they expel large quantities of mucus, the bacterial flora of which will prove a wonder to the examiner. In order to determine the changes produced in milk from cows on this diet, I communicated with Professor Vaughan of Ann Arbor, who replied that he was not aware of any such condition of the milk produced by this food, that he could readily see how the bacterial flora of the intestinal canal of the animal might be changed, and he believed that the diarrheas were produced by the excrement of the cow getting into the milk. Dr. W. A. Kratzsch, in an article on "Infant Feeding" in *Pediatrics*,

Vol. VII., 1899, has had the same experience as the writer.

The cows should be tested for tuberculosis at least twice a year, and those responding to the test should be destroyed at once. Ninety-eight per cent. of cows responding to this test will present post-mortem evidences of tuberculosis. The other two per cent. may be cases of such recent infection that post-mortem evidences are not perceptible. Even if this small percentage were not infected, it would be obviously unwise to attempt to save any of the number responding to the test. Dr. Jacobi believes that two out of every hundred cows will be found tuberculous. This percentage on Long Island, where the breeds of cows susceptible to this disease predominate (*viz.*: Jersey and Guernsey) is evidently too high. They should be examined daily for excoriations of the teats and udder and also for suppurative conditions in the udder. Garget is much more prevalent than is generally supposed. It is frequently overlooked by the milker or its importance not recognized. Woodward of Philadelphia reports a case of a woman who became very ill after drinking milk which was supplied by her dairyman. An examination of this milk showed that pus and streptococci were present in large numbers. Up to the present time no streptococcus toxin has been found; however, the very alarming symptoms produced by their ingestion would indicate the existence of one.

Garget is frequently caused by abrasion of the teats, the infectious matter finding its way into the milk ducts by continuity of structure, and, hence, the cows should not be permitted to pasture in fields covered with underbrush. They should have access at all times to a pure water-supply. They should be driven to and from pasture slowly, avoiding hurry and excitement of any description; they should be well groomed twice each day and have an abundance of straw to lie on at night. A nervous animal, or one not susceptible to domestic training, should not be used in the production of milk for infant feeding. As soon as a cow is discovered rutting the milk should be discarded. This condition should be anticipated by the dairyman in order that the exclusion may be as early as possible. During this period there is first an excess of proteids and later a diminution below the normal.

Prior to milking the udders and teats should be thoroughly washed and the cows aproned, to avoid filth and hairs falling into the milk. The first squeezes should be discarded, so that the bacteria which have found their way into the milk-ducts may be washed out. Dr. Vaughan has found bacteria in the milk of the fortieth squeeze. It is worth mentioning in this connection that the hair on the udder should be kept clipped. The washing should be done by one of the dairy hands and he should be followed by the milker, who has prepared himself as carefully for this procedure as a surgeon does for an operation. The milk should be received in sterilized pails fitted with double perforated covers, between which is interposed a layer of sterilized asbestos. This substance is suggested because it can be washed and sterilized at a high temperature and used repeatedly. The milk should then be rapidly cooled and poured through another sterilized filter into bottles and kept on ice for delivery.

The cows should be housed in large, well-ventilated barns, with an abundance of air. Dr. MacVail of Scotland remarks that "by closing every opening and by raising the temperature of the barns by means only of the animal heat of the cows themselves, you may turn a barn into a laboratory for the production of both milk and tubercle. There is no more absolutely preventable disease than tubercle in cow's sheds."

The milking should be done in a room used for no other purpose, and this should be kept scrupulously clean. Dr. Adams of Washington observed that milk which had been produced with a view to purity became contaminated, and upon investigation it was found to be due to sweeping the milking sheds just prior to milking, causing the air to be filled with dust.

Milk so produced will not require sterilization at either high or low temperature. The bacteria will not all be eliminated, but the pathogenic ones certainly will be. Indeed, the point is not yet settled whether most of the bacteria found in milk are not harmless. In this connection it is well to remember that although milk from the human breast is sterile at the time of leaving, it immediately becomes contaminated with organisms the moment it enters the mouth of the child. I believe it is a point settled among those engaged extensively in infant feeding that sterilization or even Pasteurization of milk is a necessary evil. Booker distinctly states that it certainly is not a dietetic measure, but a disease-preventing one. Brush states that when milk is boiled it is at the same time killed. Certainly some of the albuminoid constituents are coagulated, thereby retarding their digestion and destroying their nutritive value. It is quite established that some of the living cells in milk do not undergo digestion at all, but enter directly into the lacteals and thence into the blood-current. Of course sterilization will not destroy the toxins already produced and thereby many times offers to the unthinking a deceptive security. Winter reports two cases of scurvy in infants fed exclusively on Walker-Gordon milk which is a sterilized product. Sterilization also changes the fats and in some way interferes with the natural emulsion.

Recently the production of cream has been receiving some critical attention. Starr of Philadelphia has made observations on infants fed on Walker-Gordon milk. He classifies under three heads, *viz.*, the satisfactory, the partially satisfactory, and the unsatisfactory. Of the first class he has seen but three in as many years. Of the second class he has seen sixteen cases, and of the third class thirty-five cases. The first class embraced children continuously fed on the laboratory milk from shortly after birth to the time of

beginning of mixed diet; the second class included cases on laboratory milk from six months to a year, and the third class included infants fed upon laboratory milk after the first eight weeks of life. He also states that he has never seen an infant from two to ten months able to stand a laboratory mixture of stronger proteid percentage than 1.5 per cent., and he has often seen cases of two months and more unable to digest a percentage of .5 per cent. He attributes this to a destruction of the natural emulsion by the centrifugalization which in some way lessens the digestibility of the proteids, leading to diarrhea. A microscopical examination of the artificial emulsion prepared from centrifugal cream does not differ essentially from that prepared with gravity cream, except perhaps in a very few instances the oil globules were found much larger and irregular in shape. However, this may not have been the result of centrifugalization.

The bottled milk should be kept on ice during delivery and also kept on ice until prepared for use. Instructions should be left with the family in which the milk is to be used, detailing the importance of maintaining the milk in its purity, giving instructions for the preparation of the food in separate bottles for an entire day. Just here is where the superb advantages are apparent to the country practitioner and his patient. With a competent dairy at his door, the milk could be prepared according to a stated formula, with all the exactness which characterizes the laboratory product, and with the additional advantage of being fresh from the cow and delivered to the family all ready to slip the sterilized nipple on at proper feeding time. It seems that this possible advantage has never been considered, much less realized by the village doctor.

The question now arises, How can such dairies be established and supervised?

My first answer is that heretofore the first and most important requisite in the establishment of a model dairy for the purpose of infant feeding has been neglected, *viz.*, the selection of a suitably-educated dairyman. Taking one dairyman with another, as found in country villages, they usually rank in point of honor with the best citizens of their respective localities. If interested in their vocation they may perhaps have given some thought and study to the production of a superior milk. In many instances active competition has been a spur more or less effective, but in a milk for infant feeding this does not suffice. *We are asking for a technical product, and necessarily the producer must have a technical knowledge of the manner and method of producing the required product.* It is not enough that his dairy should be inspected at intervals by a committee of physicians, a bacteriologist and a veterinarian, because in the meantime, between these visits, errors in the care of the herd, in the technic of milking and handling the milk in a sanitary way, will occur without recognition by a man who is not sufficiently skilled to appreciate the importance of an absolutely clean product.

Therefore, the person engaged in the production of milk for this purpose should be specially educated and trained. He should be a veterinarian to the extent of recognizing transient illnesses in the cow, of adjusting her proper food and hygienic housing. He should have sufficient knowledge of bacteriology to recognize the importance of producing a milk as nearly free from micro-organisms as possible and totally free from the pathogenic ones. To this end he should have entire supervision of every employee in the dairy, and no one who is not perfectly well or who has come in contact with any contagious disease should be permitted to enter the establishment.

These requirements, of course, are very exacting and a man of a high order of intelligence for this work will be necessary. Nor are these attainments altogether sufficient, for the spirit of commercialism might predominate and in many instances overbalance the discretion of the producer. My second answer is that the dairyman should also be supervised; and this leads to another important question. By whom?

Every town and village possesses at the present time a body known as a board of health, whose duty it is to preside over the health of the community where they have jurisdiction. Not only should they quarantine known cases of contagious disease and exert a vigilance for the suppression of nuisances, but they should concern themselves about any cause leading to a subversion of health. The helpless infant, who has been so unfortunate as to be deprived of his natural food, is, or should be, not only the object of solicitude upon the part of the parents or guardians, but of careful watchfulness on the part of that body to whose care is entrusted the general well-being of the community. It is unfortunate that health boards as at present constituted are incapable of dealing with these subjects. They are health officials by virtue of holding political office, which in no way applies to the principles of sanitation, and the board very frequently includes an incompetent health officer. The laws governing such appointments should be revised.

The supervision of dairies for the production of milk for infant feeding is certainly well within the duties of health boards, and as these are subordinate to the State Board of Health it would really amount to State supervision of the milk-supply for this purpose.

A board of health to undertake this work, if not already so equipped, should embrace a veterinarian and a health officer who is capable of either making the necessary chemical and bacteriological tests or of overseeing them. Every producer of milk for infant feeding should be obliged to submit his herd and premises to inspection and his product to examination at any time. He should be granted and should hold a certificate from this board as long as the exactions are complied with. At the same time, the board should interdict by ordinance the sale of milk for artificial feeding of infants not bearing their official seal. We believe that with such a system in

operation, it would result in the immediate reduction of the present appalling infantile mortality at least fifty per cent.

Little claim is made for originality in this paper, it being chiefly a more or less rambling statement of facts, some of them well known. But, if it results in stimulating a deeper interest in this most important branch of medicine by my fellow country practitioners, the effort will obviously not have been in vain.

SUBPHRENIC ABSCESS FOLLOWING APPENDICITIS; TWO CASES.[1]

BY J. F. BALDWIN, M.D.,
OF COLUMBUS, OHIO;
MEMBER AMERICAN ASSOCIATION OF OBSTETRICIANS AND GYNÆCOLOGISTS.

Case I.—Mrs. C., aged forty-nine years, widow, mother of two grown children. She was seen in consultation with Dr. D. R. Kinsell, Jr., June 3, 1899. Had appendicitis in 1894. This was a well-marked and severe attack. Following this she had mild attacks every year and another severe attack in May, 1898. In November an umbilical hernia, which previously had never troubled her particularly, became strangulated, but was finally reduced by taxis. This attack of strangulation was followed by more marked symptoms of chronic appendicitis. March 30, 1899, her present trouble commenced and has continued since that time. She is now suffering from great pain and tenderness in the region of the appendix and along the ascending colon. There is an enlargement and some tenderness of the liver, this enlargement being distinctly downward. She has lost considerable flesh. During this entire time she has had some elevation of temperature and increase in the pulse rate. She is, however, exceedingly fleshy so that an examination is very unsatisfactory. The enlargement of the liver is the most noticeable feature that can be demonstrated. The tenderness and pain are situated farther back than is usual in appendicitis, leading to the diagnosis of an appendix placed behind the colon. Owing to the long continuance of her symptoms, operation for the removal of the appendix was advised and was done June 6th at the Protestant Hospital, several members of the American Medical Association being present. Because of the supposed location of the appendix the incision was made well over in the loin and longer than usual in order to enable the liver to be thoroughly examined. Through the incision a greatly elongated and catarrhal appendix, which was found running up behind the colon, was removed by inversion. The right lobe of the liver could be easily palpated and although much enlarged, this enlargement seemed symmetrical and smooth. Owing to the fat, however, it was not possible to make a thorough examination (without undue traumatism). As there was no pus around the appendix the incision was closed at once with a figure-of-eight silkwormgut stitch. Convalescence was entirely satisfactory and during the two weeks that the patient remained in the hospital she was quite free from pain, although there still persisted a little elevation of temperature which could not be satisfactorily explained. On her return home, however, the old pain and soreness again manifested themselves, although now above the location of the appendix. I saw her several times in consultation with her physician, but owing to the large amount of adipose could only say that we must wait for something to manifest itself. The liver was apparently greatly enlarged, but the cause of the enlargement was obscure. Had it not been for the febrile disturbance a diagnosis af malignancy would have been unhesitatingly made. The elevated temperature and pulse-rate were the only manifestations of any infection. There were no chills nor sweats.

July 20, 1899, her physician informed me that a new feature had presented itself, and on seeing her with him I found every evidence of a chronic abscess pointing on the right side at about the tip of the twelfth rib. I advised an immediate opening of the abscess, which was consented to and was made the following day under cocaine anesthesia, the incision being made just below the twelfth rib. The incision gave exit to an enormous amount of pus, and on introducing the fingers a large ragged cavity was found between the liver and diaphragm. The limits of the cavity were far beyond the reach of the fingers. The cavity was washed out, drainage tubes inserted and convalescence was entirely uneventful, the cavity closing in about six weeks.

Case II.—Miss C. W., aged sixteen years, was seen with her physician, Dr. Cooperrider, at 5 P.M. July 26, 1899. On getting her history, I found that she had assisted her mother in the housework the day before, although not feeling entirely well. In the afternoon of that day she was taken sick with cramping pains in the stomach and with vomiting. She did not think she was sick enough to send for a physician. Rested fairly well during the night. Was sick on the following morning, but did not wish a physician and none was called until afternoon. He found her with a temperature of 103° F., pulse 130, abdomen tympanitic. He at once telephoned me, as he thought the case was one demanding prompt operation. When I saw her, an hour later, her temperature was still 103° F., pulse 136 and poor; abdomen tympanitic and tender throughout, but especially in the region of the appendix. The patient's general appearance indicated such a serious condition that I at once united with her physician in urging an immediate operation.

Operation was done the same evening at 8 P.M. at the Protestant Hospital. As I expected to find sero-pus I did not make the usual gridiron opening, but a straight incision about two inches in length. On opening the peritoneal cavity some opalescent fluid escaped. Introducing

[1] Read before the Ohio State Medical Society, May 9, 1900.

the fingers the appendix was reached without difficulty, as there were no adhesions and no attempt had been made to hedge off the abdominal cavity. Drawing up the appendix the end was found gangrenous and perforated, an enterolith just protruding. The appendix was cut off and removed in the usual way, catgut being used throughout. The pelvic cavity was wiped dry and the incision closed with silkwormgut and temporary drainage. The drainage was removed a few hours later and convalescence was entirely uninterrupted. As she was somewhat homesick she left the hospital August 15th. For the last four or five days of her stay in the hospital there was a very little, but almost constant, elevation of temperature, for which we could not account, but attributed to her nervousness. The evening of her return, however, following a chill, her temperature run up to 104.5° F. with corresponding general disturbance. I saw her the next day with her physician, but was unable to find the cause of the trouble. There was no evidence of any inflammatory disturbance in the region of the colon or in the pelvis. There was, however, a little tenderness on pressure just below the short ribs on the right side, and I told her physician to watch this point for the development of trouble.

From this time, August 16th, until August 28th, she continued to have irregular fever, with frequent pulse and profuse perspirations. By this time the liver had become depressed below its proper position, so that the lower border was some three-fingers breadth below the ribs. There was no bulging at any point, so that we were unable to decide whether the pus, which we were satisfied was present, was in the liver or between the liver and diaphragm. She was profoundly septic and her failing strength and cachexia indicated the importance of doing something for her relief. Accordingly, on August 28th an operation was done at her home, as she and her friends objected to her being taken to the hospital. An exploratory incision was made on the right side just below the border of the ribs and parallel with them. This opened directly on the liver, which was found entirely normal, but with a mass of exudate back of the suspensory ligament with evident adhesions at this point. The general peritoneal cavity being walled off by sponges, the finger was forced into these adhesions and the pus cavity found. This was about the size of a small orange, with a somewhat ragged interior. The cavity being thus opened was washed out and a counteropening made for drainage lower down on the right side and a drainage-tube wrapped in gauze introduced. This drainage-tube passed well up between the ribs and the liver into the concavity of the diaphragm. The gauze sponges were then carefully removed and iodoform gauze packed in between the liver and the opening so as still to protect the general cavity. The first opening was then closed with silkwormgut as usual. Convalescence was remarkably prompt, the abscess and wound healing thoroughly in about two weeks.

I have thought it wise to report these two cases of subphrenic abscess because the subject, while not entirely new, is one which is not familiar to the great majority of the members of the profession, especially when occurring as a complication of appendicitis. After a study of the statistics presented in the monographs of Leyden, Maydl, and Sachs, together with the addition of a few other cases that have been reported, including a most interesting case and *résumé* by Dr. A. H. Freiberg of Cincinnati, I am able to find but 43 cases of this form of abscess following appendicitis. My two cases, therefore, make the 44th and 45th cases. Unfortunately, a considerable number of the reported cases have not been diagnosticated until the autopsy, and yet I think that when the attention of the profession is once directed to this point a diagnosis should be promptly arrived at in the great majority of cases, if not in all. While subphrenic abscess without regard to cause is a very infrequent occurrence, from the cases collected by Maydl it appears that appendicitis furnished the second largest number of cases.

Pathological examination has shown that these abscesses may be either extraperitoneal or intraperitoneal, the position of the appendix possibly determining which variety will be found in any particular case. In my first case, as the appendix was behind the cecum, I am inclined to believe that infection extended upward behind the peritoneum and that the entire abscess was, therefore, retroperitoneal. (I may state in passing that I have seen one case of appendicitis in which the abscess burrowed up behind the colon, perforated the diaphragm and was discharged through the bronchial tubes. The discharge was taking place in this way when I first saw the case, but the history and physical examination established the diagnosis very satisfactorily. I advised non-interference and gave a guardedly favorable prognosis, which was verified by the patient, a child, making a perfect though somewhat slow convalescence.)

When the appendix is free in the peritoneal cavity one would expect to find the intraperitoneal form of abscess, the infection having been doubtless carried by the peritoneal currents from the region of the appendix to the diaphragm. My second case was undoubtedly of this variety. The diagnosis must evidently be based upon the continuance of the symptoms of infection after the removal of the appendix or after the subsidence of the inflammatory symptoms in the region of the appendix. Careful examination under those circumstances would reveal some tenderness in the region of the liver, with a depression of its lower border owing to the accumulation of pus and exudate between its upper surface and the diaphragm. Pain in the right shoulder has been noticed in a number of cases which have been reported, and would be an important factor in making a diagnosis. It was present in neither of my cases. Hiccough, from irritation of the diaphragm, is also a rather common symptom. It

occurred in my first case but not in the second. In a number of cases which have been reported the pleural cavity became involved by contiguity of tissue, so that the diagnosis was for this reason obscure, and in a number of instances the real trouble was entirely overlooked and only found at the autopsy. An important point in diagnosis in many of these cases is that frequently a subphrenic abscess due to appendicitis contains gas as well as pus, this being due to the escape of gas from perforation of some other hollow viscus in the neighborhood; or more likely still to the presence of gas-producing bacteria. In these cases the presence of the gas in this location would render the differential diagnosis somewhat more simple. In such instances great stress must be placed upon the points brought out by Leyden, namely: (*a*) The previous history of the patient pointing to abdominal rather than thoracic trouble. (*b*) Normal vesicular murmur and normal fremitus at the apex with a sharp line of differentiation from the amphoric respiration found below. On deep inspiration the line of normal fremitus descends to where the amphoric breathing had been previously noticed. (*c*) Very slight displacement of the cardiac apex. (*d*) Slight bulging of the intercostal spaces and no chest-wall immobility. If the pleural effusion is free the differential diagnosis will be much simpler, since there will be no change of the subphrenic conditions when the patient assumes the horizontal position. Aspiration, if the pleural effusion is serous, will show serum above the diaphragm, while pus will be secured by a second aspiration a little lower down.

Since the same causes which produce subphrenic abscess may also result in abscess of the liver, cases will occasionally occur in which a differential diagnosis between these two foci of suppuration may be impossible.

If the disease is unrecognized and, hence, not treated surgically the mortality is very large. Beck's investigations show recovery in only a little over 5 per cent. of these cases. Under proper surgical treatment, however, according to Maydl, the mortality should not exceed 50 per cent., and late reporters make the mortality still less. The treatment of subphrenic abscess is necessarily surgical and should be, I think, conducted through an incision made rather well back on the right side, so as to strike the abscess directly, if extraperitoneal, or through adhesions, if time has permitted their formation. If no adhesions are found, this incision will best allow drainage with protection of the general cavity by gauze. While in a number of instances a cure has been effected by going across the pleural cavity, no surgeon, I think, would operate in this way except under a mistake in diagnosis. Such a method of operating would be distinctly proper in cases seen late and in which a collection of pus already exists in the pleural cavity. In these cases the subphrenic abscess would be most easily in reach from the pleural cavity by incising the diaphragm.

While I think most of these abscesses can be reached, as in both of my cases, by going below the ribs entirely, it should be remembered that the pleural cavity normally stops on a level with the tenth rib and that it is therefore possible to resect this rib and then by pushing off the pleura, resect portions of the ninth and even the eighth, as recommended by Berg, and thus reach the abscess most directly. The danger of wounding the pleura, however, must not be overlooked, and certainly manipulations in such close juxtaposition to the pleura would not unlikely result in a secondary infection of that cavity. It is for this reason that I am inclined to look with more favor, on theoretical grounds, on the infracostal incision.

(*Note.*—After the reading of this paper its author was told by three members of the Society that they thought they now understood the cause of death in a case which each had had in his practice during the last few years. There is, indeed, probably little doubt that this form of abscess occurs more frequently in cases of appendicitis than statistics seem to show, and that its apparent infrequency is due to lack of recognition.)

PETROLEUM IN THE TREATMENT OF PHTHISIS.[1]

BY WILLIAM DUFFIELD ROBINSON, M.D.,
OF PHILADELPHIA.

CRUDE petroleum, as yielded by Pennsylvania wells and most other sources, is a liquid oil of specific gravity of .86 to .87, of strong, offensive odor, and in color ranging from light yellow to greenish black. It consists of many hydrocarbons of vastly different volatility and specific gravity. They are separated by fractional distillation. A temperature of 800° F. is attained before the last volatile parts distill over. Crude petroleum yields of gasoline, 1-½ per cent., purified naphtha, 10 per cent.; petroleum benzine, 4 per cent.; kerosene, 55 per cent.; lubricating oils, 17½ per cent.; paraffin wax, 2 per cent.; loss, gas and coke, 10 per cent.

Each fractional distillate is purified by agitation with sulphuric acid by means of an air-blast. After subsidence and separation it is washed with water, agitated with alkali and again washed. That which remains after kerosene and all the more volatile parts are removed is what interests us. It includes the paraffin oils, or so-called amorphous paraffins, the soft, fat-like substances officially named petrolatum molle, and petrolatum spisse. The paraffin oils are still further refined by heating with animal charcoal and repeated filtration through this or purified dehydrated clay. Any paraffin wax in solution is removed after separation by subzero temperature. The oil resulting from this treatment is a much greater refinement of the official oleum petrolatum. It is absolutely odorless, colorless and tasteless, and non-irridescent or fluorescent. A form known as terraline by the refiners is a semi-solid, yellowish

[1] Read before the American Climatological Association, May 3, 1900.

opaque, of slight odor and taste. It contains some paraffin wax and has not had full charcoal treatment. That containing a little more wax is petrolatum molle or the cosmoline and vaseline of commerce.

In 1885 Drs. Samuel G. Dixon and Archie Randolph published the results of their experiments with the administration of vaseline. From four to eight drams were given daily. Every grain was reclaimed, unchanged, from the stools, save minute loss attributable to separating and purifying. In the "London Letter" to the MEDICAL NEWS of April 22, 1899, there was published observation of the same results after the administration of terraline. This corroborated Dixon and Randolph. My own study has been made mostly with the most perfectly-refined product, the colorless, odorless oil, before mentioned. That every minim swallowed passed unchanged entirely through the intestinal tract of man was repeatedly proven. It was argued by the English writer that, since all could be reclaimed from the feces, it could have no therapeutic effect other than simply lubricating the intestines and so making bowel-movements easy. Reliance on securing any other result was vigorously discouraged. It can be assuredly asserted that the effect of the administration of these petroleum products is decided and is far more than a simple intestinal lubricant. In over fifty selected cases where nutrition, digestion, and body-weight were impaired, and the purest oil administered in one- or two-dram doses, four times a day, for periods of from three to six months, there was in every instance increase in weight and improvement in health, strength and feeling of well-being.

The gain in weight was 5¼ to 23½ pounds. There was no other change in living conditions or medication which might have caused these improvements. It gave no discomfort in any instance, as it is absolutely indigestible and unchangeable in the intestinal tract, and so no ill of any kind resulted. Nature evidently made no effort towards its digestion or assimilation. In passing of gall-stones I have given nearly a pint in a few hours. Its action must be purely mechanical and solvent. By its constant and diffused presence in the intestines, the environment for micro-organisms was necessarily changed and the adaptability for their growth lessened. Fermentive and putrescent changes were controlled and normal functions along the entire tract were reestablished. The intestinal toxins were not formed, or, if some developed, they were dissolved by the petroleum and so carried off. Indican and ethereal sulphates disappeared from the urine. There is little, if any, doubt that its germicidal effect is purely mechanical. Each micro-organism of necessity is dependent for its existence on the freedom and integrity of its avenues for taking air and nourishment. Should these avenues be mechanically closed by petroleum oil, possessed of its peculiar qualities, the micro-organisms must of necessity die of starvation and suffocation. If it is possible to control the pathogenic micro-organisms of the intestinal tract by such innocuous mechanical means, a valuable addition will have been made to the treatment of chronic bronchitis, incipient and actively established phthisis.

The elimination from the intestines of pathogenic germs and their products by this benign mechanical means secures the conserving of Nature's potent forces for undivided defence against disease-activity in the bronchi and lungs. A close study of the results of its use indicates that it accomplishes all the advantages secured from cod-liver oil and that it is wholly free from the many objections characterizing that unstable animal oil. The action known as alternative seems to be equally as well secured by petroleum as by cod-liver oil. As Nature always makes a more or less successful effort toward the cure of those diseases where an alternative is indicated, and as these same conditions are nearly all associated with disease, disorder, or functional inactivity in the intestines, the elimination of the latter means undivided and therefore stronger and more certainly-victorious efforts in mastering disease-activity in other organs. Chemical intestinal bactericides are all more or less absorbed and the tax of their elimination is an added embarrassment. Nearly all are dissipated long before the entire course of the intestine has been traversed, thus differing from petroleum.

Petroleum also possesses the valuable property of being an ideal solvent and diluent for many remedies popular in the treatment of phthisis, such as creosote, the fixed oils, and nearly all volatile oils and alkaloids and many chemicals. When this oil is used hypodermatically and under antiseptic precautions inflammation does not result and it speedily disappears, physiological action not having been thus far recognized. Theoretically it should be ideal as a fluid for compression of lung by intrapleural injection; I know of no other substance of its approximate properties but that is chemically changeable and may be a food for animal and vegetable life. Many remedies, the therapeutic effects of which are brought about by constitutional impression after absorption, have the quality of objectionable local irritant action when given undiluted. The usual solvents and diluents have decided effects not indicated or desired, namely, alcohol in various strengths, glycerin, volatile and fixed oils, and fats that may become rancid and are of difficult digestion. In many instances pure petroleum oil may replace such solvents, as it offers scarcely more objections than pure water. I have extensively given from five to ten grains of salol in two drams of this oil, four times a day, and reclaimed the oil from the feces and found it to contain some salol and its components, phenol and salicylic acid. This proves the carrying of a chemical antiseptic and antiferment through the entire canal. Phosphorus may be dissolved in it for hypodermic administration. It is a solvent of iodine, sulphur, beta-naphtol, naphtaline, menthol, thymol, camphor, and iodoform. Oleic acid and oleates are

soluble. By the addition of a little ther, chloroform, or oleic acid the field of its power to dissolve is greatly increased, and includes many of the alkaloids.

There is no evidence indicating that that which is removed from crude petroleum in refining has any medicinal virtue. Its range of usefulness as an assistance in combating phthisis is plainly apparent, both by its almost unique mechanical action and in association with other remedies. It is the best medium for the conveyance of remedies by nebulization to the throat and bronchial tubes. It is the ideal remedy for the cure of all forms of constipation, and for treatment of tuberculous diarrhea.

MEDICAL PROGRESS.

Suppurative Bartholinitis.—For the practitioner unable to secure aid, A. Cuche (*La Revue Méd.*, p. 366) recommends the following treatment: The inflamed gland is fixed between the left thumb and index finger, punctured with a bistoury, the wound of which is enlarged to 1.50 cm. with scissors, thoroughly evacuated and cleaned of its mucopurulent contents. Into the cavity a bit of potash pastile is introduced and left. The caustic soon diffuses itself naturally or more rapidly if at first it is crushed. The opposite labium majus must be protected with soft gauze. The next day the cavity is occupied by a black slough, which is the pyogenic membrane of the suppurated gland, separates about the eighth day, and healing is present about the twentieth with an insignificant cicatrix. The patient need hardly cease her occupation.

Charcot-Leyden Crystals and Eosinophile Cells.—There is nothing pathognomonic in the presence of Charcot-Leyden crystals; they occur in various diseases of the air-passages, in nasal polypi, tumors, leucemic blood, pus, in the feces with intestinal parasites, and normally in marrow. In all conditions, normal or pathologic, they stand in intimate relation to eosinophile leucocytes. In order to determine both together in the tissues, B. Lewy (*Zeitschft. f. klin. Med.*, Bd. 40, Hft. 1 and 2) places these in a concentrated solution of magnesium sulphate, then washes with water and hardens in alcohol. Rather thick sections are then stained with eosin. Eosinophiles, like other leucocytes, are ubiquitous, but it necessitates the aggregation of a large number to develop the crystals. The best objects to study, besides blood, are cervical cancer and nasal polypi. Here the crystals appear as red rhomboid bodies partly in the stroma, partly in the cells themselves. The cells are often seen to be ruptured, so that the granules lie extracellular and always, where these are most abundant, the greatest number of crystals occur, showing the intimate relation between the two. Partially putrefied tissues generally give the best pictures, making it probable that the inorganic salts which are liberated through decomposition fix the granules and at the same time precipitate the crystals. The exact relation between both structures is not well known. It is possible that the mother-substance of the crystals, dissolved in the tissue-fluids, exerts a positive chemotaxis on leucocytes and is then taken up by these, rendering them eosinophilic. This mother-substance would thus be an excrementitious product to be removed by the cells. Against this theory, however, is the fact that transitional forms have never been seen. Possibly the mother-substance exerts an attraction on the acidophile cells in the blood and these then yield the material necessary to form the crystals.

Pathology of Pernicious Anemia.—In examining four cases of pernicious anemia, K. Faber and C. E. Bloch (*Zeitschrift. f. klin. Med.*, Bd. 40, Hft. 1 and 2) found achylia gastrica due to a diffuse inflammation of the gastric mucous membrane with atrophy of the glands and cyst-formation. In the intestines, contrary to previous autopsies, diffuse atrophy could not be demonstrated. In certain circumscribed areas about the mesenteric border, the walls of the gut were much thinned and the infoldings much less prominent than normally, but these changes were due to dilatation. In previous cases, atrophy of the intestines has been described as a constant feature, but it is probable that these lesions were due to the action of ferments and bacteria together with post-mortem distention. The condition of the stomach is not the cause of the anemia, but it seems likely that both have a common origin of toxic or infectious nature, the stomach in this respect being affected similarly to the spinal cord in which small circumscribed myelitic areas, which later coalesce, abound about the vessels.

Non-Tropical Chyluria.—W. E. Predtetschensky (*Zeitschrft. f. klin. Med.*, Bd. 40, Hft. 1 and 2) discusses the case of a Russian who developed chyluria although she had never left Europe, and concludes as follows: (1) Chylous urine may result from a fistulous communication between the lymphatic and urogenital system. (2) It may also be due to lipemia, the kidneys secreting a fatty urine. (3) Tropical chyluria is always parasitic and due to the Filaria sanguinis hominis or Disthoma hematobium; non-tropical chyluria not dependent on lipemia may be caused by the Eustrongylos gigas and possibly also by Tinea nana. (4) The pathology of the non-parasitic types is not known, but these may depend on tumors, peritoneal adhesions, etc. (5) Certain peculiarities of the non-tropical disease, such as the absence of sugar in the urine, the occurrence of periodic attacks and the varying composition of the urine during the twenty-four hours, require further explanation.

Pancreatic Digestion of Casein.—From an extensive series of experiments B. K. Rachford (*Archives of Pediatrics*, June, 1900) reports that both the diastatic and proteolytic action of rabbit's pancreatic juice go on more rapidly when the juice is acting upon a mixture of starch and

albumen, than when acting on either alone. The digestion of casein is slightly facilitated by maltose, milk-sugar or lime-water; it is greatly increased in the presence of sodium carbonate and slightly retarded by combined hydrochloric acid. Bile assists the pancreatic juice in digesting casein and causes increased activity of the juice in the presence of combined acid. Thus the beneficial action of hydrochloric acid is not confined to the stomach, but as combined hydrochloric acid it is continued into the intestinal canal where, provided that the supply of bile is normal, it not only aids the pancreatic digestion, but also acts as an intestinal antiseptic by its restraining influence on fermentative bacteria.

Human Hematolysine.—Most diseases result from the excess of the action of some morbid agent over the reaction on the part of the living organism. In many instances the morbid substance may be acted upon by therapeutic means; yet there are diseases in which the causative factor is quite unknown, and such M. Metchnikoff thinks *(Buleltin de l'Académie de Médecine,* Paris, June 4, 1900) we may be able to influence favorably by increasing the resistance of the tissues. Following out the recent discoveries of cellular toxins of animal origin, such as are contained in the serum which kills spermatozoa, that which destroys the renal epithelium, or that which dissolves leucocytes, he has found that by inoculating a goat with human blood the goat's serum becomes a hematolysine capable of stimulating to great increase of red blood-cells and hemaglobin when injected into the human circulation.

Gaseous Gangrene.—G. Moscatello and C. Gangitano (*La Reforma Medica,* May 21-22-23, 1900) give the result of an extended research. The progress of our knowledge of gaseous gangrene has not kept pace with our knowledge of other infections. Some have looked upon gangrene as a variety of diffuse inflammation, while others as due to a specific cause. They report five cases in which accurate clinical, pathologic and bacteriologic data were kept, and the results of some years of observation. Moscatello was among the first to isolate the germ causing the disease. From clinical symptoms they describe two groups: First, gangrene of the tissue with emphysema, rapidity of systemic infection, and a tendency to the progressive invasion of adjacent sound tissue. Second, like the above, but with no tendency to involve adjacent sound tissue. Bacteriological examination showed the presence of (1) staphylococci and streptococci in some cases; (2) bacillus coli communis in two cases, once with streptococci and once with the proteus vulgaris. (They dissent from the opinion of Chiari, Hitschmann and Lindenthal, that the bacillus coli communis produces gas only in diabetic subjects, inasmuch as the writers proved that the injection of bacillus coli communis with proteus vulgaris excites gangrene in non-diabetic subjects. (3) Proteus vulgaris, in itself, is not capable of producing gaseous gangrene. (4) Bacillus aërogenes capsulatus (Welch), large bacillus with rounded ends, encapsulated, immobile, easily stained, growing readily in ordinary nutritive media, evolving gas and occasionally forming spores. This last rarity of germ, if injected into veins or tissue, provided the tissue were sound, produced no appreciable effect; but if injected into a body with lowered vitality, in which body at some site distant from the point of injection, a mechanical lesion (*e. g.,* bruise or burn from chemical caustic) had been made, a typical gaseous gangrene abscess would then result at the site of such trauma. From these and from other experiments, it is fair to presume that this organism does not assume a pathogenic rôle in *sound tissue,* but it will multiply and set up gaseous gangrene in tissue altered or lowered in vitality. Clinically they find that alone, the bacillus aërogenes capsulatus has a tendency to localize abscess-formation with but little involvement of adjacent sound tissue; but, if associated with other bacteria (already described), it will involve such tissue rapidly and progressively. Prognosis they believe to be much better than heretofore observed, owing probably to the use of antiseptics; in their five cases there were no deaths. Relatively, the probability of a cure is greatest when we have to deal only with a single infection; when, however, the infection is a mixed one, *e. g.,* streptococci and staphylococci, the prognosis is more grave. Treatment consists of free opening of the abscess, removal of dead tissue, and copious irrigation of the wound with antiseptic solutions. In the mixed infection with progressive involvement of the parts, amputation should be practised early, care being taken to amputate in sound tissue.

Tetanus Antitoxin.—H. L. Van Natta gives a history of a case of a child of five years suffering from tetanus which came under his notice. The wound was made by treading on a rusty nail which penetrated the foot to the depth of half an inch. In the *Therapeutic Gazette* for June, 1900, the history is given. Four days after the injury there was difficulty in mastication and fever set in. The next day the temperature was 100° F., pulse 120, and the posterior cervical muscles painful and rigid. Two grains of chloral and potassium bromide every two hours, together with small doses of quinine and five minims of tincture of passiflora, were administered. The patient gradually grew worse in all respects. Antitoxin was advised and telegraphed for, but through some mistake did not arrive until one week later. In the meanwhile the temperature had risen to nearly 103° F., the pulse to 135, and the respiration to 40 per minute. Opisthotonous was well marked. Spasms occurred on the slightest provocation. The only food which could be taken was small quantities of milk and beef tea. Sleep was out of the question. The bromide of potassium was increased to 10 grains and the chloral to 8 grains every two hours. Whisky

was given freely. Finally, when the antitoxin did come, the patient was so far gone that the physician hesitated to give it. However, it being the only chance left, it was administered. Ten cubic centimeters were injected just below the scapula. One hour after the child fell asleep for three hours. On the child's awaking another ten cubic centimeters were injected near the first site. The child fell asleep again and remained so for two hours, not being awakened by the spasms. The pulse had fallen to 120, the respiration was about 38, and the temperature 101.5° F. The next day the patient could open her mouth half the normal extent and was able to articulate her words feebly. The third dose of antitoxin was given and the temperature fell to 100° F., pulse 120 and of good volume. Milk and eggnog could be taken in sufficient quantity. General relaxation had taken place except in the injured limb from the knee down. After some days a sudden rise of temperature was again subdued by the antitoxin and the temperature sank to 99° F. A condition of clonic spasm existed in the injured foot for a month afterward. Van Natta's observations in the case are that he discontinued the antitoxin entirely too early. He suggests using ten cubic centimeters every eight hours until a normal temperature has been obtained. He also states that one should never fail to cauterize thoroughly every wound that possibly could have been poisoned by the entrance of toxic germs.

Anesthesia and Respiratory Impediments.—D. W. Buxton (*Lancet,* June 16, p. 1714) classifies respiratory impediments as anatomical and pathological, as clinically recognizable before and independent of anesthesia, as made apparent by the anesthesia and lastly as excited purely by the anesthesia without any physical basis. Among the last are those changes in the blood which the inhaled gas produces setting up undue venosity, imperfect pulmonary circulation and, finally and indirectly, pulmonary impediment, *i. e.*, inefficient respiratory function. The site of physical obstruction may be in the upper air-passages, nasal and pharyngeal malformations, adenoids, enlarged tonsils, hypertrophied tongue, adhesions between tonsils and faucial pillars, etc. All these add greatly to the difficulties of the anesthetization. Mechanical external causes may also impede the respiratory act, either primarily or secondarily under narcosis. Goiters, angina Ludovici, lymphadenoma, lymphadenitis, obesity, short, thick neck, emphysema and many others belong to this class. Chloroform, as a rule, is the choice in both the foregoing classes of patient. In goiters where all mucous secretions seem to be overabundant, ether increases the difficulty. Chloroform should be used and given very evenly and to the lowest degree of anesthesia possible for the work. Changes in posture from that of choice, namely, dorsal decubitus, head extended, constitute another difficulty. The guides here are the rate, rhythm and force of the respiratory movement. If these decrease, the amount of anesthetic be lessened. "One-lung" cases especially and thoracic operations in general are hazardous because of respiratory difficulty by the condition operated for, *e.g.*, empyema, or by reflex action. In general chloroform to the lightest degree simply to produce analgesia is indicated for such cases. In consciousness the patient usually takes the side where breathing is easiest. Hence, under anesthetics the same position, if possible, should be maintained. With the sound side up, by reversing often pus gravitates in abscess of the lung into the healthy side and fatality issues. In summing up: (1) Every patient has his own respiratory peculiarities with which the anesthetist must become acquainted. (2) Respiration is affected in all somewhat and in many patients profoundly. (3) Such changes may be of small moment or under other intercurrent obstruction may cause much anxiety and danger.

Surgical Aspect of Constipation.—S. L. Woolmer (*Lancet,* June 16, 1900, p. 1720) reports two cases of constipation due to peculiar malformation of the sigmoid colon. In one there was a large pedunculated sac attached to the sigmoid colon in such a way that all fecal matter drained into it. When full its weight constricted the bowel so that "ribbon" feces resulted. Defecation occurred practically by an overflow of it and then imperfectly. The second case had a very extensive enlargement of the sigmoid, so that the rectum appeared like a small bowel attached. Both cases were treated by suspending these offsets so that they emptied themselves and were less apt to fill up.

Wiring in Fractured Inferior Maxilla.—Perfect, firm apposition with opportunity to watch and maintain the same are the desiderata in treating fractures of the lower jaw, says T. S. Carter (*Lancet,* June 16, 1900, p. 1722). Splints are good but usually prevent daily inspection of the field and seeing whether the grinding surfaces of the teeth meet which is the standard by which we judge results. The use of a copper wire silver plated does away with these objections and is the surest way of treating these cases.

Wounds of the Rectum.—Quénu (*Revue de Chirurgie,* May, 1900, p. 569) says that the majority of retal injuries are by way of the anus or through the ischiorectal fossæ and the coccygeal regions. The causes are instruments during operations, treatments and examinations of the rectum, of its adnexa, of the vagina, urethra and bladder. Gun-shot wounds, tools in criminal assault, falls upon implements, and beastly practices make up the other usual means. Several cases of falls upon stumps of corn during harvesting have been reported. Two classes are recognized, gun-shot wounds and all others. Pathologically these are always the result of violence and rupture of the integrity of the peritoneal cavity. The anus is more frequently entered than its cutaneous adnexa be-

cause these are protected by the shape of the buttocks, coccyx and ischial tuberosities which tend to guide the instrument toward the anus. The site of the lesion is usually the anterior walf; its degree varies between abrasion, contusion, partial or complete perforation, into the ischiorectal fossæ or the peritoneal sac. Its depth depends on the direction of the instrument and its arrest by the sacrum. The secondary condition depends upon the establishment of fistulæ between the bowel, the vagina, the bladder and skin surface, and infection through the instrument, primarily itself septic, or secondarily from the rectal contents. The sepsis may be diffuse or more often circumscribed. Fistulæ are by no means an inevitable sequela. The peritoneum may be involved high up in the sigmoid or low down. One or more aspects of the bowel may be involved and, according to the size of the implement, for a variable extent. The serosa may be lacerated only after another viscus has been perforated, as the bladder. The organs secondarily wounded have been vagina, bladder, sigmoid, jejunum, duodenum, diaphragm, anterior mediastinum, and ribs. Within the serous cavities may occur any class and degree of exudate. The symptoms vary with all the possible factors of the case. In the slight traumatisms prompt healing occurs. In the more extensive wounds the cicatrization may be slow, accompanied by discharges, fistulæ and painful defecation. When the wound involves the peritoneal cavity there comes the early or late appearance of local or general peritonitis. Death usually ensues from the peritonitis or septicemia or from shock, which may be such as to mask the other symptoms greatly. The invasion of periproctitis must always be watched for. Wounds and perforations of the bladder give a distinct shadow to the picture, varying between hematuria, cystitis, incontinence, painful urination, the signs of fistula, and at times reflex suppression. The sphincter ani may escape without damage or be partially or completely without full control. The treatment of wounds not penetrating the peritoneum concerns arrest of hemorrhage , asepsis, antisepsis, drainage, primary repair. Hemostasis is difficult in wounds about the vagina and when high up. For the latter posterior division of an otherwise intact sphincter or wide divulsion of the sphincter ani gains space for the ligation of individual vessels. Packing over the bleeding area through a speculum is often sufficient. Allingham's rectal tamponade is very valuable. It consists of a large piece of gauze with strong thread attached to its center. This center is passed high above the bleeding points and the packing is made in the pocket of gauze thus formed. Pressure is increased by traction downward on the cord against counter-resistance from without. Drainage must be free and continuous. If the break in the rectum is from without, suture of the wall is indicated with ample drainage through an enlarged, straightened pocket-free wound in the pararectal tissues. If the bladder is also perforated continuous drainage through a catheter is the indication. A laparotomy must be done in all cases where the peritoneum is torn or any of the pelvic and abdominal organs injured within its cavity. In gunshot wounds of the rectum the vast majority involve a fracture of some part of the pelvic girdle. If this has been respected the path is from one sacrosciatic foramen to the other, or from one to the obturator foramen of the same or opposite side. The chief clinical features of these cases are (*a*) bleeding through the skin wounds or into the rectum, either or both, primary and often insignificant, sometimes fatal, secondary usually grave and apt to be fatal; (*b*) local sepsis commonly apparent at the end of a few days from fecal matter; (*c*) violent suppuration and sometimes gangrene; (*d*) the exit and entrance wounds are puffy and contused, with thick serous or purulent discharge suspending fecal matter, or containing gas and urine; (*e*) vast abscesses of buttocks, thighs or ischiorectal regions; (*f*) systematic signs of gangrenous or septic invasion. The mortality is 42 to 48 per cent. Recovery is slow and complicated with fissures, stenosis, incontinence, various degrees of paraplegia. The treatment is free vent for discharges, evacuation of rectum, division of sphincter with perhaps drainage, opium and milk for constipation to decrease the chance of infiltration. Divulsion of the sphincter is too evanescent to be of much value.

Secondary Cataract.—In at least seventy-five per cent. of all cataract extractions secondary cataracts appear within three months which subsequently interfere more or less with the vision. It has been generally considered that this secondary cataract depends on thickening and opacification in the capsule of the lens. W. H. Bates (*New York Med. Jour.*, July 7, 1900) gives the results of numerous experiments which he has made on the eyes of rabbits, showing that the secondary cataract is not formed by the capsule, but by the formation of new connective tissue in the anterior chamber. It seems that the repeated evacuation of the anterior chamber during the operation for extraction of the lens is followed by the formation of fibrin in the anterior chamber and in the pupillary area, in and about which the connective tissue develops which forms the secondary cataract. By simply evacuating the anterior chamber repeatedly with a hypodermic syringe the same result may be obtained. The reason for the appearance of the cataract oftentimes so late was found to be due to the fact that it was formed early but remained transparent for some time, being gradually replaced by opaque tissue. A number of experiments led the author to believe that the fibrin-forming ferment appearing after evacuation comes not from the cornea but from the blood-vessels and lymph-spaces of the iris and ciliary body. Many substances were injected to prevent the formation of such a cataract and attempts made to dissolve one already formed, but

without avail. It was, however, found that if a quick operation was performed and the contents of the anterior chamber were restored by salt solution the secondary formation could be prevented. A section of the cornea is made and normal salt solution immediately injected. A central corneal suture is then inserted and after free capsulotomy the lens is extracted, the anterior chamber again filled with salt solution and the suture tied. Three sutures or more may be used if necessary. All experiments were conducted upon rabbits, but it is reasonable to suppose that the secondary cataract of man is produced in a similar manner and may be prevented by similar means.

Coccygodynia.—A cure of this condition by removal of the coccyx is stated by M. D. Makuna (*Lancet*, June 16, 1900): Lad, eight years of age; pain over sacrum preventing sleep and sitting erect; emaciation; anorexia; coccyx pointed downward and backward; tip prominent and painful on pressure, touching seat when sitting up; last two segments of the sacrum pointed forward and perhaps pressed in the sacral nerves; perhaps due to malformation, or to malnutrition; no history of traumatism; could not be surgically approached without damaging sacral nerves; nutrition, diet and tonics; then removal of the coccyx, first bending it back out of a median incision, cutting it free with bone forceps and then from above down excising it to save pelvic floor; complete recovery.

Anal Fistula and Phthisis.—Upon this subject S. G. Gant (*Med. Record*, July 7, 1900) makes the following points: The two conditions often are associated generally; the pulmonary precedes the rectal and anal disease; there is no proof that lung tuberculosis can be caused by fistula. Two main varieties are discussed differentially, the tuberculous and the non-tuberculous. The important features of the tubercular fistula are external and internal openings relatively large, triangular, of bluish undermined edges. The adjoining skin of the buttocks is undermined; the hair is abundant, long and silky; the nails are clubbed; facies often phthisical; voice husky, complexion sallow; emaciation rapid and marked; discharge profuse, whitish and watery; probing causes slight pain; anorexia; faulty digestion; sleep fitful and broken by sweating; tubercle bacilli may be in discharge; hemoptysis and cough may be present; anus patulous. The clinical aspect of the non-tuberculous anal sinus is as follows: External and external openings small, round, with red edges, situated in the center of an elevation; buttocks practically normal; hair, nails, face, voice, complexion, nutrition all normal; discharge slight and yellowish; probing painful; appetite, digestion and sleep natural; discharge contains principally colon bacilli; no hemoptysis; no cough, no relaxation of the sphincter. Palliative treatment is applied to non-operative cases, *i. e.*, asepsis, antisepsis, cleanliness, irrigation, mild caustics, good food, tonics, rational hygiene. Operations are best done under chloroform. Opening and curetting is first, excision second in choice. Ligation is obsolete.

Leucemia and Lymphocythemia.—W. Murrell and W. Spencer (*Lancet*, June 16, 1900) report a case of leucemia and lymphocythemia treated by establishing collateral circulation with the following result: January 27, 1900, free evacuation of eight pints of bloody ascitic fluid through median incision between umbilicus and pubis. Free drainage continued till 31st; the tube was removed February 5th; a week later splenic enlargement and recurring ascites; copious albuminuria, and emaciation. February 20th collateral circulation established and gradual improvement followed. March 14th superficial abdominal veins growing larger; a previous mitral regurgitant murmur had become louder and a systolic murmur appeared over the second left intercostal space; albumin absent in the urine; blood improving; April 19th aortic murmur gone, mitral murmur soft and low; June 1st reported in good health.

The Identification of Blood of Individuals.—It has been recognized for a relatively long time that the blood of human beings could be easily and certainly distinguished from that of any other mammal by the size of the red cells, but the attempt has probably never before been made to distinguish the blood of one person from that of another. The importance of so doing can be readily appreciated in connection with medico-legal evidence. W. H. Birchmore (*New York Med. Jour.*, July 7, 1900) has given the details of the apparatus and methods which he has used for some time in making thousands of blood-counts and he has come to the conclusion that he can without hesitancy swear to the fact that two specimens are not those of the same person and can with considerable certainty say that the blood of one stain is the same as that of some other presented. The latter proposition is, of course, the more difficult to prove. The details of the methods used are most elaborate, for exactness and accuracy are everywhere essential, and no one but an expert with long experience could be certain of his results. The sources of error are many for the discrepancies in the best of eyepiece micrometers are oftentimes very great. The personal equation must also be fully considered. The author believes, however, that by making a large number of blood-counts and plotting the results into curves opinions of considerable legal value can be given.

Cardinal Sign of Acute Peritonitis.—E. S. Bishop (*Lancet*, June 9, 1900) says the symptoms of peritonitis, usually described in the books, may or may not be present and, therefore, permit one to hesitate as to the diagnosis. The sign which is always present and is invariably indicative of acute peritonitis is rigidity of the abdominal muscles. The examination must be carefully made. A cold hand causes spasm of the recti, but not true rigidity. The surgeon must sit, the

hand must be warm and must be very lightly placed flat on the abdomen for a few moments and then gently moved to and fro. A moderate experience will enable one to determine the presence or absence of rigidity in this manner. This sign is positive, is objective, and is not modified by the personal equation of the patient.

Puerperal Toxemia.—In discoursing upon the treatment, preventive and curative, of eclampsia, J. C. S. Gauthier (*La Revue Médicale*, p. 361) mentions the value of chloral, bromide of potash, phlebotomy, milk diet, steam baths, etc. But special attention should be given to the use of the fluid extract of veratrum viride in small hypodermatic doses for the reduction of the cardiac excitement, arterial tension, renal congestion, and cutaneous inaction. All these indications are met more or less completely by the drug alone in doses of ten to fifteen drops. Hypodermatoclysis and enteroclysis in addition not only stimulate a failing, overtaxed circulation, but eliminate actively through the skin and kidneys the toxic products, really aiding the drug very distinctly and often definitely combating its bad effects. For a long time serum by injection or transfusion has been employed to combat nervous shock, surgical or accidental, and hemorrhages, postpartum and traumatic. In fact, the final effect of veratrine is nervous shock, a bleeding without loss of blood, accompanied by collapse, cold perspiration and emesis. Hypodermatoclysis acts more promptly than enteroclysis and lacks the dangers of venous transfusion and the difficulties this presents to the average practitioner. Under the influence of this prompt therapeutic measure the heart soon recovers, the normal arterial tension recurs, the emesis ceases and diuresis soon appears. In general, forced delivery as an item in the treatment of all cases of eclampsia is to be condemned, because septicemia too often supervenes. Energetic medical treatment with remedies of approved value has usually succeeded in the writer's hands. Still further, he claims that all microbic infections can be treated in this manner, puerperal septicemia, typhoid fever with hemorrhage, enterocolitis and green diarrhea in the newly-born, and all cases in which antisepsis of the lower bowel is wanted. The concluding points are: Enteroclysis produces prompt elevation of the arterial tension; the maximum of this increase occurs in about ten minutes; diuresis after a rectal injection of hot saline solution (110°—120° F.) begins with and accompanies the arterial tone, and the thermal reaction also occurs at the same time.

Vasomotor Conditions in Cardiac Disease.—In many cases of cardiac disease far greater relief can be given to the patient if treatment be directed to the condition of the blood-vessels rather than by treatment which influences the heart-muscle itself. In a leading article of the *Therapeutic Gazette* for May, 1900, the importance of the vasomotor system is brought forward and attention is drawn to the cases of valvular disease in which should a high arterial tension be present, regurgitation would most certainly be increased. Such valvular lesions of both mitral and aortic valves are frequently met with. It would be the height of folly to administer large doses of digitalis in these cases, and yet how often do we see this done! The proper drug here indicated is nitroglycerin which will diminish the quantity of work done by the heart by lowering the arterial tension. In cases where arterial tension is not very high, it will be found that from three to five grains of iodide of sodium or iodide of potassium every six hours for several days will prove of great advantage. The benefit derived from these iodides in the repression of arterial tension warrants their use for a long period. Where the arterial tension is suddenly lowered, as in surgical "shock," or collapse, vasomotor relaxation takes place. Here it is highly important to combat the condition by improving the vascular tone. This is best done by atropine which in addition to stimulating the heart will also cause the resistance to be restored which the organ is acustomed to meet normally. It will be found in all cases of vascular or circulatory trouble, whether due to high arterial tension or vascular relaxation, that particular attention directed to the blood-vessels will prove of great value.

Incarcerated Retroflexed Gravid Uterus.—The symptoms and diagnosis of this condition are as a rule easy, especially with the aid of anesthesia, says C. Reinecke (*Münchener med. Wochenschr.*, June 19, 1900), but the treatment is all important. Free evacuation of the bowels by enemata; complete emptying of the bladder by catheter when possible, by aspiration when necessary; bimanual reposition *per rectum* or *per vaginam*, not in the middle line directly past the sacral promontory, but rather to one side of it to gain space; the abdominal hand receives and perfects the reposition; lithotomy position in simple, genupectoral posture in the difficult cases; anesthesia if necessary; pessaries to combat relapse until the fifth month; abortion if all other means fail. The after-treatment consists of rest in bed, regulation of diet and functions, and, most important, frequent emptying of the bladder to avoid its backward pressure.

Albuminuria Following Renal Palpation.—C. Menge (*Münch. med. Woch.*, June 5, 1900) has seen renal hematuria with albuminuria in several cases in which the kidney had been examined bimanually and in which no albumin had been present in the urine before examination. He explains this phenomenon by assuming that the pressure to which the kidney is exposed causes circulatory changes which permit of the transudation of serum from the renal capillaries. Certain factors are of importance in determining the degree of albuminuria; thus, the duration of the palpation, the general condition of the patient, the rigidity of the abdominal muscles and the degree of nephroptosis present all modify the amount of albumin.

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No. 111 FIFTH AVENUE, NEW YORK.

Subscription Price, including postage in U. S. and Canada.

PER ANNUM IN ADVANCE	$4.00
SINGLE COPIES	.10
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SATURDAY, JULY 14, 1900.

PLAGUE AND THE CHINESE IMBROGLIO.

THE present excitement in the Far East, if it leads to the neglect of quarantine precautions, may prove to Europe and the United States a source of serious danger from an unexpected quarter. According to the latest reports Hong Kong, where the present epidemic of plague began in the spring of 1895, is still infected by the disease. There have been great variations in the virulence of the epidemic and at times it has seemed as though the city were rid of it, but the gratulatory sense of security has always proved illusory. The district of Kowloon on the Chinese mainland, opposite Hong Kong, is also infected. At Macao, a Portuguese possession thirty miles southwest of Hong Kong on the China coast, there were 150 deaths from the plague during April, nearly 200 in May, and as many more are estimated to have occurred in June. On the island of Formosa off the Chinese coast there have been nearly 300 deaths from plague during the last four months.

It is evident, then, that it is no exaggeration to say that the seeds of a serious epidemic of plague may be scattered broadcast before the present Chinese difficulties reach their solution. All of our Western coast especially will need to be most carefully guarded. We have attained during the last year a knowledge of the virulence of the present epidemic of plague that does away with the idea, so long prevalent, that the disease is liable to attack with severity only the native population of Eastern countries. It took Oporto, in Portugal, over seven months to rid itself of infection and even then, after freedom for four months, there is a recent announcement of the recurrence of the disease. Buenos Ayres is still suffering from the disease and last week the official report from Rio Janeiro showed that 25 new cases of the disease and 12 deaths had occurred. In addition to the places named, plague now exists at Aden, Port Said and Alexandria on the Red Sea, in many of the seaport towns of Australia, at Manila, at Honolulu, at Lorenzo Marques in South Africa, and at Mauritius.

The recent circular of the surgeon-general of the United States Marine-Hospital Service advised insistence upon a fifteen-day quarantine where ships come from plague-infected ports or are suspected of possible contact with the disease, instead of the ten-day quarantine that was recommended by the International Plague Convention of Venice, held three years ago. This recommendation has ample justification in the fact that the introduction of plague in many places seems to have been due to too short quarantine.

The feature of prophylaxis that is attracting most attention in Australia is the destruction of rats in seaport towns. Despite the most careful precautions plague has found its way through sanitary cordons and, as the Sydney correspondent of the London *Lancet* says, has spread like a grease-spot ever farther from the original focus. The rodents have been the carriers of the disease. It is to the rats also that recrudescences of the disease are due after a city seems free, and has not suffered from freshly imported infection.

Practical measures for the limitation of the number of rats are well worth serious consideration. Efforts to infect them with special diseases to which rats alone are liable have in Australia, at least so far, been attended with no great success. Bounties have been freely offered for the destruction of the rodent pests and by this means their numbers have been greatly reduced. With our present sanitary regulations the introduction of the disease into any of our cities need be matter for no serious concern except for the presence of so many of the rat tribe.

Plague is a rat, rather than a human, disease. It might easily get beyond sanitary control if a city's rats should become infected. Now that plague is spreading and is liable to spread still more, the reduction of the rat nuisance in all our seaports seems to be a simple matter of plain sanitary duty.

THE MOSQUITO AND RECRUDESCENCE OF MALARIA.

THERE have been made during the last ten years some interesting observations with regard to the recurrence of malaria in localities where for many years endemic cases of the disease had not been observed. In Chicago, as the result of the turning up of the soil for the foundations of the World's Fair buildings, a number of cases of genuine malaria microscopically diagnosed occurred, although malaria had ceased for many years to be considered as one of the city's diseases. In New Haven, from the excavations for the foundations of the new university buildings recently, the same state of affairs asserted itself. Malaria became once more a factor in the city mortality.

From the vicinity of Boston a similar occurrence is reported. In order to make a cutting for a railroad, some hundreds of Italians were brought into a neighborhood where for many years no cases of malaria had occurred amongst the inhabitants. Some of the foreigners suffered from malaria while the earth was being dug up. Shortly afterward cases of malaria developed in individuals who had never been out of the neighborhood and who had evidently acquired their infections as the result either of the fresh turning of the soil or of the presence of the Italians or both.

These facts have been advanced as rebutting the mosquito theory of the spread of malaria. According to them the disease seems to be rather the result of a miasm, that is, some toxic material living or non-living that finds its way into the air of a neighborhood after the soil has been freshly turned up from some considerable and more than usual depth. The idea that such turning up of soil can produce malaria in a region hitherto unaffected has long prevailed. It is apparently substantiated by a long series of most careful observations.

It is interesting, then, to have pointed out by malarial experts who have given the question serious study, that these recent observations on the connection between excavations and the apparent origin of malaria *de novo*, far from subverting, tend rather to confirm in a very striking way the mosquito-bearing theory of the disease. The ordinary and most common mosquito, scientificially known as Culex pipiens, does not carry the malarial plasmodium. Anopheles, the malaria-bearer, requires special conditions for its development. One of them, and the essential one for the evolution of this mosquito, is stagnant water. Culex requires from twenty-four to forty-eight hours existence in water during its larval stage. Anopheles requires eight to ten days or more. For the full development of Anopheles, then, an ordinary puddle that the sun will dry up in two or three days is not sufficient, although it will serve all the developmental purposes of the ordinary mosquito. It is in deep excavations that such pools of water remain and so it is after deep turning up of the soil that malaria seems to develop anew.

In any thickly-populated neighborhood some cases of relapsing malaria may unfailingly be found. The hematozoon seems to lie more or less dormant for years in the spleen of certain patients who have contracted malaria. Such patients are prone to suffer in the spring especially from acute exacerbations of their chronic malaria which have all the typical symptoms of a recent infection. It is from such cases imported into a neighborhood that the mosquito obtains the parasites that are later distributed to those who have not had malaria.

Despite the tradition of centuries as to the miasmatic origin of malaria, it is growing clearer every day that no distributing agent for the disease exists except the mosquito.

It has been the custom to advance certain physical factors to account for the spread of infectious disease; air, moisture, wind, water, and climate have all been supposed to be prominent elements. As a matter of fact scientific studies in pathogenesis are impressing the view that physical factors play an extremely unimportant rôle in the spread of disease. Even for rheumatism the tradition of dampness as a causative element is dying out. Nearly always disease is spread by some animal agency, either by man himself or some of his parasites or pets. Malaria is not the last disease whose distribution will prove to be due to some hitherto unsuspected animal agency.

OBITUARY.

ALEXANDER J. C. SKENE, M.D., LL.D.

Dr. Alexander J. C. Skene of Brooklyn died July 4th at his summer home, Highmount, in the Catskill Mountains. He had been suffering for some time from occasional attacks of angina pectoris, but nothing was suggested by his condition to cause his family or his friends concern.

Dr. Skene was born in 1838 in the Parish of Fyvie, Aberdeenshire, Scotland. He came of a noted Scotch family, many of the members of which had been closely identified with much of the history of Scotland. The Skenes were a race of warriors, statesmen, and professional men. The boyhood of Dr. Skene was spent in his native village. He came to this country when nineteen years old. He took a deep interest in the medical profession, and soon after his arrival he entered the University of Michigan. From there he went to the Long Island College Hospital in Brooklyn, from which institution he graduated in 1863. He offered his services to the Government in the Civil War and went to the front as a surgeon. While with the army he evolved a plan for a hospital corps which to-day is in use in the army and the National Guard.

After the war Dr. Skene returned to Brooklyn and was appointed Adjunct Professor at the Long Island Medical College. He soon became noted as a diagnostician, and successful operator. He later became Professor of Gynecology and was for a long time Dean of the Long Island Medical College. He retired from the faculty about a year ago. Dr. Skene has been honored with the presidency of the New York Obstetrical Society and of the American Gynecological Society. He was also for many years President of the Kings County Medical Society.

Dr. Skene's contributions to medical literature have been many and valuable. His investigations into the injuries of the ureters due to parturition and the ravages of gonorrhea in the urethra and the peri-urethral glands, and hence known as Skene's glands, were characterized by original work. His text-book on diseases of women quickly marked him as an authority upon that subject and made his name familiar on both sides of the Atlantic.

Of late Dr. Skene had been devoting much of his time to arrangements for the establishment in Brooklyn of a free hospital for women. This institution, which was to be known as the Skene Hospital for Self-Supporting Women, he expected to open this fall. It is now hoped that the project will be carried forward to completion as a memorial to him.

Dr. Skene was a lover of art and was himself a sculptor of ability. He is survived by his wife and an adopted daughter.

JOHN ASHHURST, JR., M.D.

Dr. John Ashhurst, Jr., died at his home in Philadelphia on July 7th, from paralysis. He had been ill for nearly two years. He was born in Philadelphia in 1839, and was graduated from the University of Pennsylvania in 1860. He served throughout the Civil War as an assistant surgeon, and later became connected with various Philadelphia hospitals. In 1877 Dr. Ashhurst became Professor of Clinical Surgery in the University of Pennsylvania, and in 1888 he assumed the John Rhea Barton Professorship of Surgery, which position he held until the last academic year. Dr. Ashhurt's reputation as a writer was national. His pamphlet contributions were numerous, but he was best known by his valuable standard works on surgery. He was also prominent in scientific societies, charitable institutions and in church work.

ECHOES AND NEWS.

NEW YORK.

High Death-Rate Among Infants.—To the continuation of the hot weather is attributed the high death-rate among children during this month. For the first six days of July the deaths reported of children of five years old or under averaged 53 in Manhattan and the Bronx and 41 in Brooklyn. Saturday's report (July 7th) showed 51 deaths of children under five years in Manhattan and the Bronx, and 58 in Brooklyn. Sunday's (July 8th) list included 45 such deaths in Manhattan and the Bronx.

A Wealthy Pauper Patient.—One of the odd phases of human character brought to light in Bellevue Hospital came to the attention of the authorities on July 6th, in the case of Susan Fallon, eighty-five years old, who was brought there as a charity patient from her squalid rooms in East Twenty-second Street. The old woman was suffering from jaundice, was in rags and tatters, and having not a relative in the world to care whether she lived or died. The neighbors reported her case to the hospital. After she had been placed in a hospital-cot her clothing was searched according to the rules of the institution. Two bank books were found, one on the Seamen's Bank, showing a deposit of $1,261.24, the other on the Bowery Bank, and showing a credit of $921.75.

Death of Dr. Humphreys.—Dr. Frederick Humphreys, originator of "Humphreys's Homeopathic Specifics," died, July 8th, at Monmouth Beach, N. J. He was born in Marcellus, Onondaga County, N. Y., on March 11, 1816. His father, Erastus Humphreys, was an old-time doctor of Utica, where his son, after going through the usual medical studies, joined him in practice in 1844. Before these studies began, however, the young man had tried the ministry for a short time. In 1846 he began to investigate homeopathy, and in 1853 he became Professor of Homeopathic Institutes and Practice of Medicine in the Homeopathic College of Philadelphia. There he remained until 1856, when he discovered

his "specifics," after which he came to New York and inserted a page advertisement in every Saturday newspaper edition. Dr. Humphreys was a member of the Union League, Republican, and Church Clubs, and of the Protestant Episcopal Church of the Heavenly Rest. During recent years he had lived either at his city house, 22 West Thirty-ninth Street, or in his summer home at Monmouth Beach, N. J., or in Thomasville, Ga., where he had a winter residence.

Dr. Pedersen Appointed.—Dr. Victor C. Pedersen has been appointed Assistant Demonstrator of Anatomy at the College of Physicians and Surgeons, and Assistant Surgeon to the Out-Patient Department of Roosevelt Hospital.

New Charity Buildings.—Horgan & Slattery have advised the State Board of Charities that they have completed the preparation of plans of new buildings for the Department of Public Charities of the City of New York. Following is a list of the appropriations made and the names of the institutions for which plans have been submitted: New nurses' home at the Almshouse, Blackwell's Island, $40,000; Nurses' Training School addition at City Hospital, $42,000; Water-tower extension to Metropolitan Hospital, $10,000; New gas-holder at Infants' Hospital, Randall's Island, $10,000; New boiler plant at Infants' Hospital, Randall's Island, $12,000; New central steam plant at Randall's Island, $50,000; New nurses' home at Randall's Island, $30,000; total, $194,000. None of the work contemplated can begin until the plans submitted have been approved by the State Board of Charities.

Italian Quarter Disinfected.—The Italian quarter on the east side recently received one of the most thorough disinfections it has ever experienced. Nearly the entire Health Department squad of police, together with twenty laborers handling the disinfectant, visited every building on Elizabeth and Mott Streets above Grand, and then went through Crosby Street and the Italian colony on Baxter Street. It is estimated that 1000 houses were disinfected. The policemen, who were assigned to districts, went before the sprinklers and had the courtyards and cellars cleaned up. The sprinklers followed in two sections, one crew in charge of Dr. Blauvelt going up Elizabeth Street, and the other, in charge of T. H. White, Assistant Inspector for Contagious Diseases, taking in Mott Street. The money for the work will come out of an appropriation of $20,000 recently made by the Board of Estimate and Apportionment for the purpose. Other crowded sections of the city are to be visited during the summer, including the Chinese quarter.

Contagious Diseases.—For the week ending July 9, 1900: Measles, 179 cases and 16 deaths; diphtheria, 232 cases and 36 deaths; laryngeal diphtheria (croup), 6 cases; scarlet fever, 76 cases and 8 deaths; smallpox, 1 case; chicken-pox, 6 cases; tuberculosis, 217 cases and 136 deaths; typhoid fever, 25 cases and 10 deaths; cerebro-spinal meningitis, 6 deaths; totals, 742 cases and 212 deaths.

Barbers Must Disinfect.—The Board of Health of Yonkers has passed a duplicate of the Boston regulation which directs every barber after treating each customer to disinfect, in a manner satisfactory to the Health Inspector, his razor, strop, brushes, cup and comb.

The Pan-American Exposition.—The management has entrusted the Department of Ethnology and Archeology to Dr. A. L. Bishop of Buffalo. Many members of the medical profession are interested in the study of American Ethnology and Archeology and not a few have valuable collections of Indian relics and skeletons from Indian graves. Those not directly interested in this study are so circumstanced as to be aware of the hobbies of their neighbors and could doubtless furnish the address of collectors. Dr. Bishop will be greatly obliged for such information and for the loan of collections for the use of this department of the Exposition. Exhibits which represent study in some special line of American Ethnology or Archeology will be particularly suitable.

Broken Necks.—It is doubtful if accidents resulting in this injury are any more common than formerly, but the success that has been attained in the prompt surgical treatment of the condition has attracted unusual attention to the injury. The chances of recovery are slight in any individual case. John Young, who suffered fracture of the cervical vertebra in diving at South Beach, July 5th, was subjected to operation at the Smith Infirmary, Staten Island, but died within twenty-four hours.

Echoes of the "Fourth."—It is said that the Fourth of July just past was more generally and generously observed than for many years. The weather was fine and prosperity favored a free expenditure of money. Seven millions of dollars, it is estimated, went up in the blaze and smoke and noise of fireworks. It was quite a Chinese affair. Fingers, hands, eyes and lives were freely sacrificed. In Philadelphia seven children in one group lost their lives while indulging in these Oriental orgies. At one east-side dispensary in New York 350 cases of burns and gunshot wounds were dressed on July 5th. Only two cases of tetanus have thus far been reported, but it will be surprising if the next few days do not add a score to this list. The almost daily showers, however, have kept the streets of the city unusually clean and the tetanus bacilli correspondingly scarce.

PHILADELPHIA.

Medico-Chirurgical College.—Dr. F. Savary Pearce has been elected Clinical Professor of Nervous Diseases. He is at present an instructor in physical diagnosis at the University of Pennsylvania.

Outbreak of Smallpox.—A small epidemic of

this disease lately developed near Olney. Five patients were removed to the Municipal Hospital and the infected district quarantined. It is believed that the spread of the disease has been stopped.

Children's Country Week Association.—A special train every Thursday morning during July and August will take hundreds of children to the country for a week. Ten are sent to each farm, it being stipulated that they shall have fresh meat once a day, all the milk they want, and plenty of vegetables. The children pass a physical examination before they go, convalescents and invalids staying in the country two or more weeks.

Pollution of Water-Supply.—The secretary of the State Board of Health has notified the authorities of Norristown that an examination of the water-supply of Philadelphia shows it to be contaminated and that the most serious cause is the deposit of sewage by that city. The courts are to be appealed to if the nuisance is not abated.

Experimental Filter Plant.—This start toward a pure water-supply for the city, which was to have been completed by May 26th, is not yet working. A chemical and bacteriological laboratory is to be equipped to analyze both the inflowing and outflowing water. It is believed that sand adapted to the water to be filtered can be secured.

Compulsory Vaccination.—A decision has been rendered in the mandamus proceeding to compel the principal of a city school to admit a child who had not been vaccinated, as mentioned in this column some weeks ago. The demurrer was overruled and judgment given for the defendant. This decision upholds the legality of compulsory vaccination in the schools.

Health Report.—Deaths in the city for the week ending July 7th were 544, an increase of 47 over those of last week and of 109 over the corresponding week of last year. Heat prostrations were largely responsible for the increase. The infant-mortality was very high, 157 deaths. Contagious diseases: Diphtheria, 94 cases, 18 deaths; scarlet fever, 44 cases, 2 deaths; typhoid fever, 25 cases, 8 deaths.

CHICAGO.

Passavant Memorial Hospital.—By the will of the late T. B. Blackstone, $25,000 has been left to this Hospital; $25,000 to St. Luke's Hospital, and $25,000 to the Chicago Relief and Aid Society.

Commencement Exercises.—The Commencement Exercises of the German Hospital Training School for Nurses were held June 26th, and those of the Harvey Medical College, June 22nd. Degrees were conferred on a class of seventeen by Dr. Frances Dickinson, the President.

Fourth of July Casualties.—The Fourth of July in this city was attended by less than the usual number of accidents and deaths. One man was killed by a stray bullet, and forty-four were injured by fireworks during the day. There were ten prostrations and seven deaths caused by the heat.

City Health Matters.—At the present writing there are 12 smallpox patients in the Isolation Hospital. All of them are doing well, with the exception of one case. None of the patients has ever been vaccinated. Of the 59 smallpox patients who have come under the notice of the Department during the last sixteen months not one had a mark denoting successful vaccination. Four smallpox patients were taken from one house on June 16th and 17th, members of one family, none of whom had been vaccinated. Four other members of the same family and a number of neighbors who had been vaccinated were exposed again and again before the nature of the disease was appreciated, and none contracted the disease. At the suggestion that probably some of the cases of smallpox now being treated at the Isolation Hospital were the result of exposure by the patients before reaching Chicago, Commissioner Reynolds says that many of the cases undoubtedly are the result of such experiences.

A Diploma Mill.—To teach "How to live one hundred years or more in good health and to confer degrees and grant diplomas" are some of the objects for which a Chicago concern was recently chartered by the Secretary of State. The attention of the State Board of Health is now called to the corporation, which was licensed under the name of the "Chicago College of Medicine, Surgery and Hygiene." A directory company of this city wished to know the standing of the college before selling it advertising space in a new directory that is soon to be issued. Previous to the communication from the directory company, Dr. Egan of the State Board of Health was unaware of the existence of the institution, but immediately took steps to ascertain the purpose for which the college was chartered. The certificate of incorporation gives the purpose of the college in the following language: "For the purpose of training students in the science of life, hygiene and sanitary science, and the care of the body in sickness and in health, and for instructing and training in physical development to fullness of health, beauty and attractiveness; and for the correction of habits and modes of living tending to shorten life and making chronic invalids; and for special instructions how to live one hundred years or more in good health; and to confer degrees and grant diplomas." In his reply to the directory company Dr. Egan said the name of the institution resembled that of another medical college in Chicago which is a reputable institution and recognized by the State Board of Health, but that the Chicago College of Medicine, Surgery and Hygiene, in the knowledge of the Board of Health, has no standing.

Spectacles Prohibited at the Asylum.—It is said that 40 of the women attendants of the Eastern

Illinois Insane Hospital, every one of them wearing glasses, were recently called before the Superintendent, Dr. J. C. Corbus, and notified that he would dispense in the future with the services of such of their number as were compelled to wear glasses while at work among the patients. The Doctor's reason for not allowing the attendants to wear glasses is that they expose themselves to the danger of being seriously injured, perhaps blinded, during an attack by some violent patient. A similar order is expected with reference to the male attendants who wear glasses.

GENERAL.

The Hospital Ship "Maine."—The American hospital ship "Maine" reached Southampton July 3d, with another batch of wounded soldiers from South Africa. A distinguished party, including Princess Louise, Lady Randolph Churchill, and Mmes. Blow, Ronalds, Adair, and Chamberlain, met her in the Solent. Princess Louise, after addressing a few kindly words of welcome to the patients on board, presented each with a silver medal bearing a portrait of the ship, surmounted by American and British flags. Each man was presented also with a pipe and a pound of tobacco.

The British Losses.—The War Office July 3d issued a return of the British casualities in South Africa since the beginning of the war. The total losses, exclusive of sick and wounded, have been 29,706, of which the killed in action were 254 officers and 2403 non-commissioned officers and men; died of wounds, 70 officers and 610 non-commissioned officers and men; missing and prisoners, 65 officers and 2624 non-commissioned officers and men; died of disease, 133 officers and 4204 non-commissioned officers and men, and invalided home, 844 officers and 18,433 non-commissioned officers and men.

Notice.—The following is presented at the request of Dr. Roberts: All surgeons, assistant surgeons, acting assistant surgeons or contract surgeons, and hospital stewards, who served in the army or navy of the late Confederate States, will please send their post-office address to Deering J. Roberts, M.D., Secretary Surgeons' Association, C. S. A., Nashville, Tenn.

Marine Hospital Service and the Plague.—In accordance with the recommendations made by Surgeon-General Wyman, November, 1899, medical officers of the Marine-Hospital Service were sent as advance guards to meet the plague and if possible prevent its reaching our shores, to the offices of the United States consuls at Glasgow, Liverpool, London, Southampton, Queenstown, Hamburg, Bremen, Rotterdam, Antwerp, Havre, Marseilles, Naples, and Genoa. The services of these officers in foreign ports have been valuable, but the emergency has not been sufficient to warrant the expense of maintaining all of them abroad. It is, therefore, proposed to withdraw them from the offices of the United States consuls at the several ports, excepting Naples, but, for the purpose of observation and of maintaining a skeleton organization, to assign four of the officers now serving in Europe to Berlin, London, Paris, and Vienna.

South African Hospital Scandals.—The pressure of public opinion became so strong that the Ministry was obliged to yield to the demands for an investigation, and a commission of five, including two doctors, has been appointed. The Commission will be directed to inquire into the facts on which the charges rest, to fix the responsibility and to make suggestions for the reform of the Army Medical Service. The physicians who have been made members of the Commission are Dr. Church, President of the Royal College of Physicians, and Prof. D. J. Cunningham.

Distribution of Goiter.—Dr. Poncet of Lyons recently communicated to the Academy of Medicine the results or researches made on the present distribution of goiter in France. He estimates the number of goitrous persons roughly as between 375,000 and 400,000. These are not by any means evenly distributed all over the country; on the contrary a small group of departments are responsible for an unduly large proportion, notably those bordering on the Alps, the Pyrenees, the Jura, the Vosges, and, lastly, the central plateau. He states that the number of goitrous persons has notably diminished, especially during the last fifty years, but the distribution has not undergone any marked change.—(*The Medical Press.*)

Manila Saloons.—We predicted just what has come to pass. When the Volunteer chaplain, the Rev. Mr. Wells, on his return, was made responsible by the papers for the statement that one of the results of American occupation has been an increase of saloons from four to more than four hundred, we ventured to prophesy that local corroboration would be decidedly lacking. The Manila *Freedom* of April 21st thus disposes of Chaplain Wells's statement: "We have taken some pains to investigate this charge, and have to say that it is false in every sense. When the flag was first planted in Manila there were between four and five thousand grocery shacks, kept by Chinos and Filipinos, and every one of them sold liquors, a native product, which did more to fill graves than disease and bullets. They were not saloons but grog-shops, insidious hell-holes, and many soldiers became victims of them. Vino and other native drinks could be purchased for one cent a drink, American money, and ten cents was a sufficient sum for a common drunk and a penny or two more a bacchanalian revel. Governor-General Otis had this problem to solve during the early days of occupation, and he was happily successful in closing most of the Chino and native shacks. A license system was established and the American saloon took the place of the native saloon. With their establishment the death- and insanerates have been less, and the greatest good to the great number has thus been subserved. Instead of over 4000 places where liquors were sold we

now have less than 400, and the quality of the stuff is vastly better and the quantity less. Insidious effects of vino and native gin soon alarmed physicians and surgeons, and an order was issued to seize and destroy all of said products found. This practically eliminated their manufacture, and to get them is as difficult as it is to get liquors in the veriest prohibition town of Kansas. Hail the reform!"—(*Army and Navy Journal.*)

War Surgeons and War Physicians.—Now that the serious engagements in the South African war seem to have been about completed, *The Practitioner* promptly foresees that the attention of the army surgeons will be directed more to a medical than a surgical line. It, therefore, proposes to substitute for the consulting surgeons, who returned from the seat of war, an equal number of consulting physicians. *The Practitioner* has claimed from the first that consulting physicians are equally as important as consulting surgeons.

Mortality in India.—The Governor of Bombay telegraphs to the Foreign Office, July 9th, as follows: "There were 10,320 deaths from cholera and 6502 fatalities in the famine district during the last week in June. The total deaths among the numbers on the relief works in the British district were 5324. The number on the relief works is increasing rapidly in consequence of the drought. The number of gratuitous relief is increasing throughout the affected districts. The number of persons receiving relief is 6,013,000."

Hygiene in the British Army.—Mr. Treeves tells us that Dr. Jameson says that the only way to deal with South Africa water is to boil it, strain it, filter it, and then throw it away. Colonel Baden-Powell, on the other hand, has a unique recipe for securing aseptic water (which is not aseptic) for wounds, as follows: "Take an ordinary native girl, tell her to go and get some lukewarm water and don't give her anything to get in. She will go to the stream, kneel and fill her mouth and so bring the water; by the time she is back the water is lukewarm. You then tell her to squirt it as you direct into the wound, while you rinse it around with a feather." What does Lord Lister think of the asepsis of this method?

SELECTION.

HAFFKINE INOCULATION IN SAN FRANCISCO.[1]

THE following letter very clearly sets forth the attitude of Surgeon J. J. Kinyoun toward the inoculation of persons in San Francisco with Haffkine prophylactic, and shows that compulsion was not only avoided by him, but advised against, as an unwise and illegal measure:

[1] From the Public Health Reports of the Marine Hospital Service, July 6, 1900.

SAN FRANCISCO QUARANTINE,
San Francisco, Cal., June 11, 1900.

SIR:—On receipt of Bureau telegram of the 15th ultimo, directing me to confer with the Chinese consul-general as Bureau representative in the matter of the plague in the Chinese quarter, I have the honor to state I immediately called upon the Honorable Ho Yow, consul-general, and stated to him all the facts relative to the plague which had come under my observation or which had been brought to my notice by the local board of health. During this interview Mr. John Bennett, attorney for the consul and the Six Companies, came in and took part in the discussion. After thoroughly canvassing the matter, it was agreed by all the parties that the most reasonable solution of the question was to advise all the Chinese residents living in the infected area to submit to inoculation with the Haffkine prophylactic. I was informed both by the consul-general and the attorney that they would make such recommendations to the Chinese residents and that they would aid and cooperate with the board of healtth in carrying this scheme into effectt.

By direction of the Bureau, on the same day a few hours later, I attended a meeting of the Merchants' Association which met for a conference with the local board of health. The purpose of this meeting was intended to devise ways and means to assist the board in suppressing the disease or preventing its spread. The attorney of the Chinese Six Companies was present at this conference. The telegram received from the Bureau which made certain recommendations regarding the control of the plague was fully and freely discussed, and the main features thereof were adopted as the sense of the meeting. The impression which seemed to prevail at the close of the meeting was that the Chinese and Japanese would gladly avail themselves of inoculation in order to obviate the necessity of enforcing more severe measures.

I ventured, however, to suggest to both the board of health and the Merchants' Association that while I believed from a scientific standpoint it was the proper way to suppress a plague epidemic, I had grave doubts whether the Chinese and Japanese populace would be ready to accept it, notwithstanding it was to be recommended by those in authority. *Compulsory inoculation* was the only recourse *and that could not be considered.* The attorney for the Chinese thought if a conference could be had between the representative men of the Six Companies, the consul-general, the Merchants' Association, and the board of health, that it would be an easy matter to arrange and have it carried into effect. This conference was held on the following day at which was present the consul-general and about fifty or sixty of the representative men of the Chinese Six Companies.

The Chinese all agreed that they would recommend, by proclamation or otherwise, the acceptance of the method of inoculation. Surgeon

Gassaway was present at this meeting. I was not able to be present on account of my absence in Stockton. At the close of the meeting it was understood by the board as well as others that there would be no opposition by the Chinese to accepting vaccination. As soon as the result of this conference was made known a number of whites, among whom were several physicians who practised in the Chinese quarter, went among the Chinese and informed them that this method was exceedingly dangerous and had killed a number of people where it had been tried, and it was experimental, to say the least. Officers of the Chinese Six Companies were approached, and the statements made by these parties seemed to have the desired effect.

Immediately thereafter large numbers of Chinese residents came to the offices of the Six Companies for the purpose of ascertaining the purport of this inoculation and why it was put into effect. They were informed that the board of health had said plague was present in Chinatown, and this was the best means of eradicating the disease. Demands were made immediately upon the officers of the Six Companies that if it was not dangerous as claimed that they should first submit themselves to inoculation. This they refused to do, and immediately thereafter there occurred almost a riot. In fact, the officers of the Six Companies were besieged in their houses; some of whom, I am informed, had to seek safety in flight.

The same course of procedure was followed with Mr. Ho Yow. About 700 Chinese gathered before the consulate, making riotous demonstration, and had it not been for adequate police protection some harm might have resulted other than smashing a window glass. At 8 o'clock the same day a circular written in Chinese characters was freely circulated in the Chinese quarter. The purport of this circular was that all Chinese were requested to resist to the utmost the inoculation, and under no circumstances to allow it to be performed. On Sunday afternoon, May 20th, I was requested to come to the consulate to confer with the Chinese consul. Accordingly I arrived there in the afternoon and met Mr. Ho Yow and a number of the representative Chinese, among whom were several officers of the Six Companies. I was informed that unforseen difficulties had arisen by reason of the circular threatening Chinese business men and others if they submitted to the inoculation, and they found it impossible to persuade the Chinese to accept the inoculation.

I was asked the authority for this action. I informed them that it was a suggestion made by the Surgeon-General, and it was in nowise to be considered as obligatory and only a voluntary act on the part of the Chinese who wished to accept it. I further informed these gentlemen that there was no desire whatever on the part of the Government or on the part of the local board of health to inflict unnecessary hardship upon their people, and the motives that actuated them to make this restriction on the Chinese as a class were the best and could not be questioned. I then informed them that if this disease was not brought immediately into abeyance it would probably lead to harsher measures being instituted not only by the board of health, but by all other health bodies in the State and perhaps surrounding States. It was my earnest desire, as the representative of the Marine Hospital Service, to prevent this if it was in anyway possible. It was observed that the consul and his subordinates were much excited, and on making inquiry from same I found that a large number of Chinese had gathered in front of the consulate and commenced to throw stones at the building. At the request of the clerks I called for the police, who immediately came and dispersed about 1000 Chinese who had assembled in the street in front of the building.

I was informed by the board of health that preparations were immediately put into effect by which the inoculations would be given coincident with the house-to-house inspection, which was then deemed necessary. On the morning of the 19th a corps of physicians, with assistants, began a tour of inspection in the Chinese quarter, offering the inoculation, Every business house and residence was closed. The inspection existed only in name. I was informed that only 1 Chinese was inoculated during the day. This was the editor of the Chinese daily newspaper, who thought he could overcome the prejudice of his race by openly submitting to the inoculation. Immediately on its completion he was attacked by a mob, threatening dire vengeance, and he had to seek his quarters, where he remained for three days.

I was informed that the Chinese Highbinder element was responsible for the Chinese attitude toward the inoculation, and that they had threatened dire vengeance upon any one who would advocate inoculation or submit to it. It was evident that the Chinese race was acting as a unit and would not under any circumstances submit to inoculation. This was evidenced from what transpired at the ferries here. Chinese were brought immediately from the vessels and informed that in order to go in and out of Chinatown or leave San Francisco it would be necessary for them to submit to inoculation, and quite a number submitted to the inoculation, but always before they had been in communication with the Chinese quarter. During all this time a coterie of white physicians and others were circulating all kinds of rumors among the Chinese as to the direful effects of the inoculation. I was informed by the secretary of the Six Companies that a rumor was circulated to the effect that 5 Chinese had died suddenly from the inoculation. I took occasion to run this rumor down and found that it was absolutely without foundation. Two Chinese had become, however, quite sick on the day following, but two days after were seen about the streets. Another circular, issued by whom I do not know, was to the effect that the health inspectors were dangerous people and were liable

to poison them not only by the injection but also their food and water.

After a week's delay in attempting to give the inoculations, it was abandoned as a failure. During this time 58 Chinese, 530 Japanese, and 234 Caucasians were inoculated. A considerable portion of the time was consumed in promises of the Chinese attorneys and others in authority, who claimed if a little more time be given to the Chinese it would bring about the desired result in allowing a house-to-house inspection to be made. The board of health rested during this time, and was not a little surprised to be notified to appear in court to show cause why it and the Federal quarantine officer should not be enjoined from further inoculating or preventing the Chinese from leaving the district. It was then evident to all that the attorneys were playing for time in which to formulate their complaint and file the papers in the United States court, and it was not the intention to further aid the board of health in carrying out what it deemed necessary for the prevention or suppression of plague among the Chinese residents of San Francisco. These people had been deluded time after time by erroneous statements made in the press of San Francisco. In fact, I am warranted in stating that the truth about the plague situation has never been published.

An unfortunate feature of the suit brought was the fact that in some way the pamphlet on plague issued by the Supervising Surgeon-General fell in the hands of the attorneys of the Chinese. That part, which speaks of the Haffkine prophylactic, and particularly the statement made therein that it should not be given to any one who had been directly exposed to the plague, was used to the greatest advantage possible. Even the judge in rendering his decision laid special stress upon this point to show that this method would be highly dangerous for people who had been exposed to plague, and, therefore, could not be safely taken. I do not know whether Judge Morrow was aware of the fact that when he stated that in administering the Haffkine prophylactic under these conditions it was a tacit admission that plague did exist in the Chinese quarter or otherwise there would have been no danger in its administration.

The administration of Haffkine prophylactic has been on the whole a failure. Whether it accomplished any good or not is a question—that is, so far as the Chinese are concerned. It certainly has immunized 500 Japanese whose condition and mode of life is not far removed from those of the Chinese. In this way it has eliminated this number of being reagents in the dissemination of plague. I have stood in readiness to furnish the local and county beoards of health limited quantities of the Haffkine prophylactic on demand. I have in this manner distributed several hundred doses to health officers in the surrounding towns.

J. J. KINYOUN,
Surgeon, U. S. M. H. S.

CORRESPONDENCE.

EYE INJURIES, PRODUCING SIMILAR RESULTS IN BOTH EYES.

To the Editor of the MEDICAL NEWS:

DEAR SIR:—In the London *Lancet* for March 31, 1900, there is a report by Albert Benthall, F.R.C.P., of an extraordinary case of the loss of both eyes, one after the other, from similar accidents. His patient was a man, forty-one years old, who in 1896, while washing his face, scratched his cornea; panophthalmitis resulted and enucleation finally had to be performed. The same man in 1900, while executing similar movements, had a nearly precisely similar accident, but so far enucleation had not been thought necessary.

Although such cases do not add to the scientific side of medicine, they are nevertheless exceptional enough to deserve a passing notice, and I trust I may not go amiss if I add an observation of my own, not unlike the above. This patient, now sixty-three years of age, injured himself when he was thirty by falling against some projection in his path. The result was a cut across the cornea of the left eye, making a jagged, V-shaped scar extending nearly to the center; there was probably some prolapse of the iris, but it does not look as if the wound had become more than superficially infected. Judging from his story the wound healed slowly, but some time afterward cyclitis developed and the sight was lost; to-day the bulb is typically atrophic, with absolutely no sight perception left.

The same man, three months ago, was struck by some projection and injured his *right* eye, as he describes it, in very much the same way as the earlier accident injured the *left* eye. The same V-shaped cut was made, there was about the same amount of pain, and probably the same prolapse of iris. This time he sought professional advice at once. On examination I found a jagged wound of the cornea, some prolapse of iris, empty anterior chamber, and pain. I cut off the prolapsed segment. Suppuration did not take place, nor was there very much cyclitis subsequently, so that the condition now is not so bad as it is in the right eye. The cornea is to some extent transparent, and evident light perception is retained. On comparing the two eyes, the similarity of the resulting scars is very striking; the only appreciable difference is to be found in the transparency of the more-recently injured cornea.

The accident, by itself even, but particularly when presented so coincidently with the report of the case in England, is worth recording, if only for curiosity's sake.

Albert B. Hale.

103 State Street, Chicago, May 18, 1900.

THE PATHOLOGICAL INSTITUTE.

To the Editor of the MEDICAL NEWS:

DEAR SIR:—To some of us whose field of activity lies outside the limits of the State of New York, the nature of the controverys raging at present about the aims and purposes of the Pathological Institute must appear fraught with danger to the future evolution of scientific psychiatry on American soil. The criminations and recriminations flung to and fro should never have marred the discussion, as they necessarily obscure the real issue. The personal equation should be entirely eliminated; the principles involved call for consideration, and not the men who are purely incidental. In this light I ask you to consider what I have to say on this vital subject.

When the seventh annual report of the New York State Commission in Lunacy for the year 1894-1895 announced to the world the consummation of their long-cherished hope of establishing "a department for the special study of mental pathology," and characterized this "as the most important step and one which has not hitherto been undertaken by any State or country," I, with many others, awaited and watched the growth of this department with eager interest and expectancy. Every successive report of the Commission contained words of praise and approval of the work done at the Pathological Institute, of its future aims, etc. In the tenth annual report for the year 1897-1898 we read the following words by the President of the Commission: "And yet we maintain, as is asserted by many scientific men, not only in this country but abroad, that New York State is the pioneer in establishing this work upon a permanent basis and upon a system that will attain more beneficial results for the expenditures made than any work of the same nature heretofore instituted."

Profoundly conscious of the shortcomings of psychiatric research as heretofore conducted, positively hungry for something better, I was carried away by my—as I see now too ready—enthusiasm as best shown by the following quotation from my paer, entitled "Our Work and Its Limitations," read at the meeting of the American Medico-Psychological Association of 1899:

"After admitting humbly the utter inadequacy of our present mode of procedure, we must ask ourselves the question how we, whose life-work lies among the insane, are to proceed to add even a single jot to the future science of psychiatry? We could do more than that if we were given the proper facilities with all that these imply. We should be able to satisfy the most exacting demands for original research-wórk by the establishment at each hospital of fully equipped laboratories, by the employment of the best skill in the different branches of scientific research, and by the transformation of our asylums and hospitals into sanitaria which would attract all incipient neuropathic and psychopathic patients. Is this feasible? Will such favorable conditions ever prevail except within the confines of visionary dream-life? There is no reason why we should give ourselves up to idle speculation when the way out of the difficulty has been clearly shown to us by the State of New York in the creation of its Pathological Institute where, if untrammeled by traditional views, if fostered by a true scientific spirit, psychiatric science promises to grow to what it should be. The immense scope of the work at such an institute is best shown by naming the different branches of science that enter into the sphere of its activity; here we find psychology, psychopathology, experimental physiology and pathology, cellular biology, pathological anatomy, comparative neurology, physiological chemistry, anthropology and bacteriology. The work in some of these branches must necessarily be done at the hospitals; but even there, to be of value, it must be performed, under the direction of a specialist by trained assistants whose methods should be faultless and beyond reproach. No valid objection could possibly be raised to the pursuit of such work by our assistants and ourselves even under conditions prevailing at present, but we should certainly not attach to our labors the intrinsic value possessed by the work of thoroughly trained specialists. In this connection I may quote the following passage from the report of one of the hospitals received some time ago: 'The scientific work in the medical department is kept well abreast with the advance of the day. The pathological laboratory serves a most excellent purpose; it is of great value not only in the matter of diagnosis but in the accumulation of most interesting material.' And these words emanating from an institution that, to my knowledge, nas never startled us by particularly progressive work. I firmly believe that such words embodied as they are in a report to superior officers, *i. e.*, boards and legislatures, are bound to create the impression that the work done at that particular hospital promises to greatly advance psychiatric science. As long as we hide under the cloak of self-satisfaction relief will never come to us. Bold, oft-repeated confession of total absence of opportunities for research-work would eventually arouse popular opinion to a sense of realization of our real needs, and, with the growing popular opinion as a *vis a tergo*, the law-making bodies of every commonwealth would rise to the occasion by following the brilliant example set by the State of New York. The demands made on the hospitals for the insane for startling, epoch-making discoveries are manifestly absurd under present conditions. It is but too frequently forgotten that the man at the helm of a hospital for the insane, is, first of all, a practising physician. The fact that the peculiar nature of his patients necessitates their aggregation in large numbers under one roof does not affect the truth of the above proposition in the least. He should be a scientific physician, and by this is meant one who will absorb and digest all intellectual pabulum offered by his science, who will ever keep abreast of the times and who under-

stands how to apply the thus accumulated knowledge for the benefit of his patient. The scientist, on the other hand, is the man who evolves scientific facts and truths, and to him we must look for advanced knowledge and new methods. No river can ever rise above its source."

At the last meeting of the American Medico-Psychological Association, Dr. Wise presented a paper which proved with painful clearness that I was the victim of the grossest misconception when I wrote the above quoted passage—that the Pathological Institute had never been intended by its creators to assume the rôle of a seat of broad-gauged scientific research. Its real purpose was to remain the "hand-maid" of the hospitals, or some sort of a post-graduate school of psychiatry, where the internes of the hospitals were to be taught "more matter and less methods." The ancient obstetrical phenomenon had certainly found another brilliant illustration: *Parturiunt montes, nascetur ridiculus mus!*

As important as the establishment of a central laboratory mainly for teaching purposes may have appeared from a purely local point of view, it would have merited but passing notice by the scientific world, here and abroad, as a praiseworthy move in the direction of administrative economy and nothing more. At the Richmond meeting I frankly admitted my error and requested the Association to expunge from its records my untimely eulogy on the State of New York and its Pathological Institute. This was done with a heavy heart for I have learned to look upon New York State as the pioneer in all matters pertaining to the welfare of the insane as well as scientific progress. Is it too late to hope that some way out of the difficulty may be found, which will save the Institute from obliteration and preserve its character as an independent center of scientific research? We, of the rest of the country, can ill afford to see New York State step from its wonted high plane, for, in our struggles for better things, we have grown accustomed to sound its praise and to point to it as the shining example to be ever emulated by our commonwealths.

I have had but scant opportunities for personal scrutiny of the work done thus far by the Institute. I am waiting for results; to expect them now, after the short life-time of the Institute, would be manifestly absurd. At the expiration of ten years we should be justified in expecting conclusive evidence of the merits or demerits of its work. I am very much averse to criticise offhand any new departure from our present methods of psychiatric investigation, which, in my humble opinion, will never disclose to us the true nature of psychic disease, its true etiology and lead us to non-empiric treatment. In saying this I am aware of the fact that I am in strict opposition to the best, by me most admired, American psychiatrists. On this point I placed myself on record in my above-quoted paper in the following manner: "Even though there is cumulative evidence that some sort of causative relation exists between psychic disease and such agencies as puerperium, trauma capitis, insolation, infectious diseases, particularly lues, alcoholism and other drug-poisonings, we are still in utter darkness about the real *processus* and *causa morbi*. This deplorable inability to fathom the true nature of psychic disease makes itself keenly felt in our classifications of insanity. The grouping of insanities as psychoneuroses, psychic degenerations, organic psychoses and developmental psycho-asthenias is of undoubted practical significance, especially as their proper and timely recognition has great weight in the prognosis of each individual case. But the absence of all exact interpretation of the pathologic process renders the scientific value of such classification highly questionable to say the least. Take as an illustration a genuine functional psychosis and one that so often appears in the course of dementia paralytica; clinically the differential points are readily enough established, but can this be said of the morbid process which engenders these clinical manifestations? The earlier we recognize the fact that clinical methods of investigation will never lead to the solution of the essential nature of psychic disease, the sooner will psychiatry reach the dignity of a true science. I profess that I have no reverence for the old simply because it is old and hoary, for the traditional because it has thus far been accepted as the *alpha* and *omega* of our knowledge. Why should we shrink from the destruction of time-honored scientific idols when it will be followed by the erection of a structure grounded solidly on exact methods of modern science?"

I do not deny that some good results may be accomplished by refining our clinical methods to the very utmost; that this is possible has been clearly proven by the recent advances made in clinical psychiatry. As an example I shall mention Kraepelin's work which is characterized by a happy combination of painstaking observation and proper correlation of clinical symptoms. Kraepelin has undoubtedly succeeded in proving the existence of close relationship between some so-called forms of psychic disease where we were accustomed to look for differential points; his work has tended toward simplification of matters psychiatric and toward assisting us still further in arriving at a scientific prognosis. Such results are highly gratifying, and the work along those lines should be continued at all the hospitals for the insane that are possessed of ample financial and intellectual means, with the emphasis on the latter as most of us command just sufficient medical aid to attend properly to our patients and have but little to spare for our "cases," and I will add that I still consider *our* chief and most sacred duty to care for our patients, our prating critics notwithstanding. It is my firm belief that the true nature of psychic disease will not be known to us until the searchlight of modern science has penetrated the most secret recesses of psychology

and psychopathology, which can only be accomplished in a specially-equipped psychopathic hospital attached to an institute of such character and scope as I thought the New York Pathological Institute was to possess. Should the efforts of the scientist in that direction prove barren of results, then, I fear, we shall find ourselves facing the humiliating dictum: *"Semper ignorabimus."*

EDWARD C. RUNGE, M.D.
Superintendent St. Louis Insane Asylum.
St. Louis, Mo., July 5, 1900.

A PROTEST FROM WOODS HOLL.

WE, the undersigned, members of the faculty of the Marine Biological Laboratory, at Woods Holl, Mass., feeling that the citizens of the State of New York, and liberal-minded men everywhere, are to be congratulated upon the establishment of the Pathological Institute of the New York State Hospitals, an institution founded for the investigation of the problems connected with insanity and related diseases and unique in the annals of medicine for the greatness of its opportunities, most strongly recommend that the work of investigation for which the institute was founded be not hampered or limited by any change in its present form of organization, and that it be sustained along its present lines of organization and principles and research.

(Signed)
C. O. WHITMAN,
Director—Head Professor of Zoology, Univ. of Chicago.
FRANK R. LILLIE,
Assistant Director—Assistant Professor of Zoology, Univ. of Chicago.
FRANKES LOEB,
Professor of Physiology, Univ. of Chicago.
ALBERT MATHEWS,
Instructor in Physiology, Harvard Univ.
HENRY E. CRAMPTON,
Lecturer in Zoology, Columbia University.
GAYLORD F. CLARK,
Professor of Physiology, Syracuse Univ.
WALTER E. GARRY,
Fellow in Physiology, Univ. of Chicago.
DAVID J. LINGLE,
Instructor in Physiology, Univ. of Chicago.
AARON L. TREADWELL,
Professor of Biology, Vassar College.
S. J. HOLMES,
Instructor in Zoology, University of Michigan.
C. M. CLAPP,
Professor of Zoology, Mt. Holyoke College.
A. D. MORRILL,
Professor of Biology, Hamilton College, N. Y.
BRADLEY M. DAVIS,
Instructor in Botany, Univ. of Chicago.
THOMAS H. MONTGOMERY, JR.,
Instructor in Biology, Univ. of Penn.
WINTERTON C. CURTIS,
Fellow in Johns Hopkins University.
CHARLES W. GREENE,
Professor of Physiology, State Univ. of Mo.
W. M. WHEELER,
Professor of Zoology, Univ. of Texas.
H. V. NEAL,
Professor of Biology, Knox College, Ill.
WILLIAM PATTEN,
Professor of Biology, Dartmouth College.
MAURICE A. BIGELOW,
Instructor in Biology, Teachers' College, N. Y.
EDUARD L. THORNDIKE,
Instructor in Psychology, Columbia Univ.
ROBERT M. YERKES,
Assistant in Psychology, Harvard Univ.

OUR LONDON LETTER.

[From Our Special Correspondent.]

LONDON, July 5, 1900.

THE OPEN-AIR TREATMENT OF CONSUMPTION—PROGRESS OF THE MOVEMENT—HOSPITAL WINDOWS KEPT OPEN IN ALL WEATHER—NOTIFICATION OF CONSUMPTION AND DISINFECTION OF HOUSES ADOPTED IN MANCHESTER—THE PERILS OF CERTIFICATES OF INSANITY—CHARGES AGAINST HOSPITAL AUTHORITIES BY THE METROPOLITAN RADICAL FEDERATION—THE YELLOW-FEVER EXPEDITION OF THE LIVERPOOL SCHOOL OF TROPICAL MEDICINE—VISIT TO WASHINGTON AND TO JOHNS HOPKINS UNIVERSITY—BANQUET TO SIR WILLIAM GAIRDNER.

As I stated in a previous letter the open-air treatment of consumption is receiving considerable public attention. Another sanatorium has been opened at Stanhope for the county of Durham. All the windows have been made to open outward and are never closed by day or by night. The National Association for the Prevention of Consumption has come to the conclusion that, although consumption is rare in school children, the bad ventilation which exists in most schools produces the very conditions that predispose to the disease. The Association therefore has sent a memorandum to school teachers pointing out the importance of school ventilation. It is also thought that teachers should pass an examination in school hygiene. The committee of the North London Chest Hospital has issued a statement in which great success is claimed for the open-air treatment inaugurated last year. In wards containing twenty-four beds the windows have been kept open in all weathers, the patients being kept warm by additional blankets and the direct application of artificial heat. When it became clear that this method, combined with rest, feeding, and graduated exercise was arresting the disease, the same treatment was adopted throughout the building except in the bronchitis and asthma wards. The records show as the result of twelve months' experience that most of the patients admitted in the early stage have recovered; 76 per cent. are considered to have been permanently benefited. The registrar says: "It is common for patients to come in with an evening temperature of 100° to 102° F. and with extensive signs of mischief, and to go out with no sign of active disease, a normal temperature and an increase of a stone in weight. Nearly all return to work, some to their ordinary occupation, but whenever

possible to work in the open air. A large number of the old patients have been traced and none who has markedly improved and has endeavored to follow out the teaching given, has shown signs of relapse. If consumption is not stamped out in Manchester it will not be from want of energy of the authorities. Cases are notified to the public health department and officials are sent to the patients' houses to disinfect and cleanse them. During the last three months 145 houses from which patients have been removed to hospital have been stripped and washed with chlorinated lime. In the other cases, where the patient remains at home, the sanitary inspector makes a fortnightly visit to see that the house is kept clean and free from dust.

Two cases have just been decided in the courts which show the very unsatisfactory condition of English law on the question of certificates of insanity and the grave peril to which medical men are exposed in the discharge of their duties. In one a coachman became mentally depressed because of his wife's pregnancy. He threatened to murder her and said that he heard voices which prevented him from sleeping. A doctor was called in and ordered his removal to the lunacy ward of the workhouse from which he was discharged in three days. He brought an action for damages against the medical man, alleging that his detention was due to professional negligence. Medical evidence was given showing that the plaintiff suffered from homicidal mania and that rapid recovery was possible in such cases. A verdict was returned for the defendant with costs. As the plaintiff is in humble circumstances it is extremely improbable that the doctor will be able to recover any of the expenses he has had to incur simply because he did his duty. In the second case the plaintiff was an eccentric lady, aged forty years, who had passed an examination as dispenser. She believed she heard voices and accused the assistant matron of a religious institution in which she stopped of trying to take her soul from her by diabolical practice, of reading her thoughts, and of throwing her down in the streets. All these matters she accounted for as "thought body" phenomena. One day she visited her pharmaceutical tutor to ask him to get her an appointment as dispenser. Here the doctor who was defendant in this case saw her. She waved her arms about, talked to herself and tried to strike her host. Knowing all the facts the medical man wrote a letter to the relieving officer, stating that the woman was of unsound mind and that as she was seeking a situation as dispenser she was a danger to the community. However, the authorities refused to take any action in the matter. A suit was brought and $400 and costs were recovered from the doctor.

Inspired by antivivisection literature the Metropolitan Radical Federation has addressed an extraordinary memorial to the Committee of the Prince of Wales' Hospital Fund setting forth two matters of complaint, "one of the gravest scandals of our time." The first is that there is too much tendency on the part of doctors and students to regard hospital patients as so much material for experiment. "It seems to be an axiomatic truth that if experiments must be made on a living subject, the proper subject must be the patient himself." The second complaint is that grants from the general receipts of hospitals are devoted to medical schools. In regard to the first charge the Committee, after careful and expert inspection of the hospitals, reports that it is unfounded, and points out that it is simply a loose and scandalous charge without any particulars which can be dealt with by evidence in detail. As to the second charge the Committee reports that no grant is made from the fund toward medical schools.

The arrangements made by the enterprising little Liverpool School of Tropical Medicine for the dispatch of a yellow-fever expedition to the United States and Brazil have been completed. Lord Salisbury has requested the British Ambassador at Washington and the Consul at Para to obtain all possible facilities from the United States and Brazilian authorities. Official invitations for the expedition to visit Washington have been received from the heads of the medical department of the United States Army, and to visit Baltimore from the Johns Hopkins University. The expedition will sail on June 25th for Canada and proceed direct to Washington and Baltimore. After conferring with the bacteriological experts there it will go to New York and thence sail to Para. Advantage will be taken of the opportunity to test still further the work of the School on malarial fever carried on by Major Ross, and also to study dysentery and other tropical diseases. The Committee of the Liverpool School has arranged for a public meeting which it is hoped will be attended by merchants and others interested in tropical countries. The principal object of the meeting will be to urge upon the Government the necessity for doing everything possible to ameliorate the conditions of life in British tropical colonies—by improved sanitation, better water-supply, light railways, segregation of the European population, and other means.

The banquet given to Sir William Gairdner on his retirement from the Chair of Medicine in Glasgow University was worthy of the occasion and showed that the esteem of his fellow citizens for his high character and scientific attainments is as warm and as enthusiastic as that entertained for him in the medical world. Some friendly banter was exchanged by representatives of the learned professions as to their relative value to humanity. Sir William refrained from trying to settle the difficulty, but he mentioned that he had just received the second Chinese edition of Whitla's "Dictionary of Treatment." Did the Sheriff (who was present) ever know of a legal book being translated into Chinese and reaching a second edition?

OUR PARIS LETTER.

[From Our Special Correspondent.]

PARIS, July 4, 1900.

DEATH OF DR. CHÉRON—THE NEW PASTEUR HOSPITAL—NEW METHODS OF ISOLATION—TREATMENT OF BASEDOW'S DISEASE—DR. LETULLE'S EXPERIENCE WITH CACODYLATE OF SODA.

DR. CHÉRON, a man well known in Paris for his extensive work and his researches on the use of artificial serum, has just died. He began by studying natural history. Afterward he obtained the post of physician at the St. Lazare Hospital for prostitutes and entered upon the study of gynecology. He was the director of the *Revue Medico-Chirurgicale des Maladies des Femmes*, a journal which he directed for several years and in which he advocated conservative treatment at a time when surgical intervention was too much in fashion. Dr. Chéron was also well known for his works on hypodermic injections, he having established a formula for concentrated serum, which in small doses was used extensively as a stimulant. The composition of this serum was as follows: Pure carbolic acid, 1 gram; Chloride of sodium, 2 grams; Phosphate of sodium, 4 grams; Sulphate of sodium, 8 grams; Boiled distilled water, 1000 grams. Dr. Chéron was in the habit of injecting from 5 to 120 grams at one séance, and he usually chose the retrotrochanteric region. It should be done very slowly and slight massage employed afterward. Its use is indicated in cases of neurasthenia, severe anemia, senility and during convalescence after prolonged forms of fever.

The Pasteur Hospital which has been in course of erection during the last few years was definitely opened on July 1st. This hospital is built according to the latest and most approved ideas in reference to isolation and disinfection. The fund for its construction was given anonymously.

At a recent meeting of the Berlin Medical Society the subject for discussion was the medical treatment of exophthalmic goiter as opposed to surgical intervention. Dr. Klemperer said he did not believe Basedow's disease was one to be treated surgically and he thought the cases one was apt to see in practice are of a milder nature than those observed in hospitals, and, therefore, an operation would be hardly justifiable. In five years Klemperer has seen 80 cases of exophthalmic goiter and he has found that the best treatment is rest, abundance of food, faradization of the great sympathetic, and hydrotherapy. In one case he ordered thyroidine and 200 capsules were taken by the patient. In only one case did he call in the surgeon and the following symptoms were noticed after the operation: The pulse went down, and the trembling diminished, but the exophthalmia and the abnormal psychical condition lasted a year and a half. These last symptoms are diminishing, however, at present. Dr. Ewald said that after all the principal cause of a cure was not so much the use of drugs as the natural result of time. As for thyroid extracts, he has used them and has obtained bad results. A change of climate is sometimes beneficial. Ovarian and thymic extracts have given good results in one case each, but in another case the latter preparation had no effect.

Senator insisted on the importance of psychic causes in the etiology of this affection and the use of the galvanic current. Arsenic as the French have shown, tends to prevent the bad effects of the thyroid extract and is efficacious.

Mariani has exposed in *La Clinica Chirurgica* the results of 9 operations consisting of excision of the great sympathetic in the cervical region. One of these operations was carried out in a case of exophthalmic goiter. The post-operative results were most remarkable. Immediately after the excision of the cervical sympathetic, the eyes became less prominent, the pulse slowed down, and the cardiac disturbances disappeared. The goiter was less turgid and the patient slept better. It is to be supposed that the morbid conditions were due to compression of the great sympathetic by enlarged lymphatic glands. As to 8 other cases of epilepsy, the results obtained varied somewhat, and were not conclusive.

At the Boucicaut Hospital yesterday, I saw Professor Letulle, who is, with Dr. Cornil, the great pathologist of France, and we spoke of the new treatment by cacodylate of soda. Dr. Letulle has had very good results from it in some cases of chronic bronchitis and emphysema, in which the patients increased as much as twenty pounds in weight. Still, after having said this Dr. Letulle seemed to remain rather skeptical, and he added that such results could be obtained by other means, and that as soon as the patients were no longer under the influence of the regimen followed at the sanitarium he has established at the Boucicaut Hospital, they had a tendency to relapse into their former condition.

SOCIETY PROCEEDINGS.

ILLINOIS STATE MEDICAL SOCIETY.

Annual Meeting, Held at Springfield, May 15, 16 and 17, 1900.

Tumors of the Spinal Cord and Its Membranes.—This paper was read by Dr. Frank P. Norbury, of Jacksonville. Disturbed functions of the cord vary in intensity and kind, involving either or both the cord and its membranes. But as symptoms of organic disease, and especially tumors affecting the cord or its membranes, are similar it is necessary to study the symptoms in common. Practical diagnosis recognizes the logical sequence of symptoms and does not accept as disease what in many instances are purely symptoms. Differential diagnosis considers pathogenesis of tumors when possible. Defective function is seemingly not commensurate with existing

lesions; in some cases the reverse is true. Symptoms should be systematically considered. The plan of Eskridge is a good one, namely, (1) irritation of the nerve-roots; (2) meningeal symptoms; (3) cord symptoms. Irritation of the nerve-roots begins by changes in sensibility, such as pain, neuralgic in character. Neuralgia is apt to be the diagnosis. Sensory symptoms, usually unilateral at the beginning, become more pronounced as the neoplasm develops. Segmental diagnosis is of assistance here as soon as local symptoms appear. Motor symptoms usually give the clue as to localization. Numbness, hyperesthesia, and later anesthesia, follow along the distribution of the nerves involved. Contracture, spasm, and exaggerated reflexes of the extremities are noted. There are no pronounced differentiating meningeal symptoms, except Kernig's sign and muscular rigidity when the upper cervical region is involved. Cord symptoms are those of gradual compression, namely, motor and sensory paralysis, spastic symptoms, vasomotor, trophic and reflex changes. Differential diagnosis as to intradural, intramedullary location requires careful investigation. Vasomotor and trophic symptoms are sweating, unilateral and profuse, occasional deep capillary flushings, herpetic skin-eruptions, bed-sores, change in the skin and nails.

Differential Diagnosis.—In caries the great point is history or the presence of tuberculous infection elsewhere, to be suspected in young persons, and especially when there is a clinical history suspicious of tuberculosis. The pain, tenderness, deformity, muscular rigidity, are points in differentiation.

In carcinoma there will be a history of removal of malignant growth; constant bilateral sciatica. A case was narrated with this symptom present, and lumbar carcinoma was found after death; also some deformity, etc. Cervico-occipital neuralgia, myelitis, syringomyelia, spinal syphilitic tumor, were also considered in differentiation. The observations as made and upon which the paper was based were derived from a study of three cases, one of tuberculous tumor, intramedullary cervical region; one of sarcomatous, dorsal region, extradural, and one of carcinoma, extradural, lumbar region. The post-mortem findings confirmed the diagnosis in two cases.

Is Pneumonia Contagious?—Dr. J. T. McAnaly of Carbondale read this paper. The following conclusions and inferences were drawn: (1) Pneumonia is an acute specific and mildly contagious disease, produced by the micrococcus lanceolatus, involving the vesicular structure of the lungs in an exudate of greater or less extent, and is attended by severe and often dangerous constitutional symptoms due to toxins produced by the infecting micro-organism. (2) The isolation of cases should always be recommended. No two cases should occupy the same room at the same time. The aged and children, owing to the large mortality among this class of cases, and to the enfeebled powers of resistance of the former, should be excluded from the sick-room. (3) The room should be large and should be kept well ventilated. Pure air is most essential for the pneumonia patient. The danger of vitiated air should be constantly kept in mind. It is a point to be doubly guarded because of its harmful effects upon the patient and its dangers to the attendants. (4) The prompt and thorough disposal of all pneumonic sputa is important. It may be harmless to-day, but dangerous to-morrow. Prophylaxis is clearly one of the most important points to be considered. Since the true nature of pneumonia has been demonstrated by the bacteriologist, we may the more readily appreciate its dangers and guard against the septic possibilities resulting from pneumonic invasions. (5) The rapid increase of our knowledge of bacteriology, and the introduction of specific remedies afford ground for the hope that soon there may be discovered a treatment for pneumonia as certain and effective as that of antitoxin for diphtheria, or quinine for malaria.

California as a Health Resort.—Dr. John H. Hollister of Chicago read a paper with this title. Three questions formed the basis of the paper: (1) Persons to be benefited. (2) The locations suited to their various needs. (3) The proper care of such individuals. These questions were considered in their order. No climate in and of itself is curative. The power for recovery must be inherent with the patient. Environments at best are only helpful. Given certain recuperative powers in the individual, the conditions which may best promote recovery are (*a*) a dry soil, with freedom from soil exhalations; (*b*) a mild atmosphere, pure in quality and nearly uniform in temperature; (*c*) exposure, with personal comfort, of continuous days of sunshine; (*d*) wisely-directed daily exercise; (*e*) a residence isolated from crowded apartments, with good ventilation, proper drainage, and plenty of sunlight exposure; (*f*) a liberal bill of fare, well selected and properly cooked; (*g*) pleasant social relations and diverting pastimes. These are the ideal factors which promise most of helpfulness, so that in no single locality can one expect to unite them all. Still he thinks we may more nearly approximate such conditions in California than in any other location with which he is familiar elsewhere.

The Pathology of Parturition.—Dr. J. Clarence Webster of Chicago delivered an address on this subject. Under the head of anomalies of the hard passage he included all variations from the normal type of bony pelvis. The complications in labor associated with these conditions are among the most important in the whole field of obstetrics. In Europe much more attention is given to their consideration than in America, because it is generally believed that pelvic deformities are much more common there than here. In the light of recent work it is doubtful if this widely-held view is correct. In both continents it is very difficult to get accurate data regarding the frequency of their occurrence. In this con-

nection the author referred to the recent work of Williams and Dobbin of Johns Hopkins, saying that it is worthy of the most careful study. The observations of these gentlemen are a direct challenge to those who hold the common belief regarding the infrequency of pelvic deformity in America. Their statistics were quoted by Dr. Webster.

Contracted Pelves.—The most frequent contractions met with in practice are the folowing: (1) The justominor or universally contracted pelvis. (2) The flat non-rickety and rickety. (3) The funnel-shaped pelvis. (4) The pelvis altered by various spinal deformities. Of these, perhaps, the most common are the universally contracted and the flat.

The Use of Forceps.—Successful delivery of a head lying above the brim of a flat pelvis with a true conjugate of 2.75 inches must, indeed, be considered impossible with the ordinary long forceps unless the head be abnormally small. It is in such difficult obstetrical case that the overwhelming advantage of the axis-traction instrument is best demonstrated. Such a form as that devised by Milne Murray gives a maximum of advantage in traction and a minimum of waste of power and of danger to maternal and fetal tissues. The Walcher position was very favorably commented upon by the essayist.

Indications for the Use of Axis-Traction Forceps.—It would be unsatisfactory to mention in detail the many conditions in which the instrument should be employed. In general they were refered to as follows: In delayed labors due to: (1) Faults in the powers, (*a*) essential—the uterus; (*b*) accessory muscles. (2) Faults in the passenger, (*a*) slight enlargement or marked ossification of the fetal head; (*b*) certain malpositions and malpresentations. (3) Faults in the passages, (*a*) soft parts, (*b*) hard canal.

In dangerous labors due to: (1) Maternal complications, *e.g.*, heart-disease, pneumonia, etc.; (2) fetal complications, *e.g.*, some cases of prolapsus funis, dry labors, etc.

Indications for Performing Version.—The chief indications for performing this method of delivery were given as follows: (1) Maternal, (*a*) accidental hemorrhage and placenta previa; (*b*) eclampsia and other conditions where a hurried delivery is considered necessary; (*c*) flat pelvis. (2) Fetal, (*a*) transverse presentations, when the conditions are favorable; (*b*) prolapse of the cord in the first stage; (*c*) brow and face cases when the head has not engaged, if it is impossible to change them into vertex cases.

Indications for Symphysiotomy.—This operation is best regarded as an adjuvant to delivery by the axis-traction forceps. It may be employed where forceps delivery in the Walcher position is impossible, and where there is no doubt that the increased pelvic measurements resulting from the operation will allow the head to be extracted. It may be tried (1) in cases of pelvic contraction. Most authorities mention a limit of 2.6 to 3.2 inches in flat pelves, and 3.2 to 3.9 inches in justominor pelves. It is evident, however, that the employment of the axis-traction forceps in the Walcher position must make unnecessary, in a considerable proportion of cases, the cutting operation. (2) Symphysiotomy also has a place in impacted brow and face cases where delivery cannot be safely carried out with axis-traction forceps and the Walcher position. (3) In cases where the head is abnormally ossified or a little enlarged and delivery cannot be effected by the axis-traction forceps and the Walcher posture, symphysiotomy is indicated.

Indications for Cæsarean Section.—This operation is to be employed mainly in cases of pelvic deformity where delivery of a living child by the methods already considered is impossible. It has also been held by many that it should only be carried out where the child could not be extracted by means of an embryotomy.

Porro-Cæsarean Section.—This should be employed (1) where the patient is particularly anxious not to run the risk of a second pregnancy, owing to the impossibility of delivery through the vagina; (2) where the uterus or appendages are so diseased as to render probable the necessity for a subsequent operation; (3) where owing to a prolonged labor, in which other manipulations have been tried, infection of the uterus has occurred.

Indications for Embryotomy.—At the present time the tendency is to limit the destruction of the fetus to those cases in which it is dead and cannot be delivered by forceps, turning or symphysiotomy; in the case of the living child, to those in which some marked fetal abnormality exists, as a large hydrocephalic head, tumors, monstrosity, etc. In view of the modern improvement in the technic of abdominal surgery, whereby the mortality of Cæsarean section has been greatly reduced, a physician takes upon himself a grave responsibility in recommending the destruction of the living child.

Treatment for the Opium Habit.—Dr. Archibald Church of Chicago read a paper on this subject. In the *British Medical Journal* of July 10th, 1897, Dr. N. Macleod of Shanghai reported seven cases which he had treated by what he called the "bromide sleep." Briefly, the purpose of the bromide treatment is to stupefy the patient utterly for a number of days, during which time the opium is rapidly withdrawn and recovery had from the physical disturbance secondary to its withdrawal. The plan of treatment was hit upon by accident. Macleod states that early in 1897 a neurasthenic woman, addicted to morphine for nine years, by accident had administered to her two and a half ounces of sodium bromide in something over two days. A profound sleep was introduced, lasting several days, and when its effect wore off the craving for morphine had ceased, and with it the various disturbances which had led to its use. A few months afterwards a pilot, who was addicted to morphine and alcohol, agreed to try the effect of the treatment, and no suffering was experienced during the

withdrawal of the morphine, craving for which, as well as for alcoholics, disappeared on recovery from the bromide sleep. Dr. Church submitted the histories of two cases treated by the Macleod method. In the first case the result was excellent. The second case, which might otherwise have been a successful result, so far as the bromide treatment was concerned, terminated fatally, perhaps by the bromide aggravating a nephritis. The method of administration which has been gradually developed as the result of the experience of Macleod and the observation of the essayist, was formulated thus: The drug should only be given in the daytime; 120 grains of sodium bromide in a half tumbler of water, every two hours, until an ounce is given in the same day, and this may be sufficient, or it may be necessary to continue the doses in the same way on the third day. Macleod says a safe rule is to cease the administration of the bromide after twenty-four hours, when drowsiness is so profound that the patient cannot be aroused, or, when aroused, is incoherent. If the sleep continues or becomes deeper, no more bromide will be needed. It is to be remembered that the bromide acts in a cumulative manner. After the second or third day, when the bromide is withdrawn, the drowsiness, in some cases actual coma, tends distinctly to deepen for forty-eight hours, so that the fully-developed sleep presents a rather alarming condition to any one not familiar with it. For two or three days there is difficulty in feeding the patient, and swallowing is sometimes impossible, so that rectal alimentation is required. During this treatment there is apparently a tendency to aspiration pneumonia, so that feeding by the mouth becomes doubly dangerous. Any septic condition in the pharynx or in the antra communicating with the mouth should contraindicate the treatment. The poisonous effect of the bromide falls apparently upon the respiratory and cardiac centers, so that a weak heart or impaired pulmonary conditions would furnish reasons against the method. From the case of nephritis that terminated fatally, it is strongly suggested that bromide of sodium in large quantities acts harmfully upon the kidneys, if diseased, and therefore any degree of nephritis should be a contraindication to this line of treatment. Three deaths occurring in twelve cases, although in each instance ascribable only remotely to the bromide, and occurring where the bromide had been used in extraordinary doses—doses that can no longer be advised—show that the plan of treatment is very far from being simple and without danger. However, as compared with the difficulties of the ordinary methods that are pursued in correcting addiction to morphine, it seems to the author to be of very definite value in well-selected cases, and in such cases he would not hesitate, under appropriate safeguards, to employ it.

Yellow Fever in Cuba.—No new cases have appeared at Quemados for ten days.

REVIEWS.

The Criminal. His Personnel and Environment. A Scientific Study. By AUGUST DRAHMS, Resident Chaplain State Prison, San Quentin Prison, San Quentin, Cal. With an Introduction by CESARE LOMBROSO. New York, The Macmillan Company.

Clinical Studies in Vice and Insanity. By GEORGE R. WILSON, M.D., Medical Superintendent, Mavisbank Asylum. New York, The Macmillan Company.

THESE two books represent the point of view in an excellent manner. From the vantage ground of method they appeal to widely-diverse tastes. In theory they would attain much the same end although there are minor variations in the subject matter. The work on the Criminal is essential philosophical; that by Dr. Wilson is presented from a distinctly clinical standpoint. The first is full of carefully-presented ideas; the second deals with masses of incoherent facts.

Drähms assumes as a central thesis that crime is largely a social disease. "As such, it is clearly not an accident, nor a misfortune, nor yet an incident that clings to the skirts of advancing civilization, but is the result of distinct causes, whose genesis and amelioration through preventive methods and the application of proper remedial agencies, it is becoming more the fashion of contemporary thought to explore." He, thus, is largely Spencerian in his tendencies and his philosophy in the mode of handling the problems involved is molded widely on that thinker's outlines. The criminal as a part of society, made so largely by its own structure, is certainly a fascinating theme, and we have read the author's work with much interest and profit. The more interest, perhaps, because, emanating from a theological source, we had prejudged a series of dissertations on moral laws and moral judgments coming from Above. The effect, then, of finding a distinctly logical and shrewd handling sensibly heightened the enjoyment of reading. We find the book fully the equal of that of Havelock Ellis and one of the best we have met, not barring the classics of Italy, France and Germany. The chapters are as follows: The Philosophy of Crime, Criminal Identification, Criminal Classification, The Instinctive Criminal, his psychology, origin and heredity, The Habitual Criminal, The Single Offender; Chapter X. deals with the Demography of Crime and, finally, there are considered The Juvenile Offender, Hypnotism and Crime, Punishment, Reformation and Prevention.

The one fault that the book has, if it be considered a fault, is its leaning towards the dry statistics of that peculiar Italian product, measurement anthropology.. The author fully realizes the dangers of the school, but almost in the same breath that warns he speaks forth the conclusions derived from such mensural methods. Such methods are extremely interesting and suggestive, but, like the doctrine of probabilities, they

analyze truly what has taken place, but are of minor service in the estimation of what is definitely to happen.

The work deserves a wide reading, especially by that large class of would-be-reformers that are ever with us, anxious to change the broad general lines of the psychology of the human species by some small legislative detail that appeals to their own parsimonious intellect.

The second work, we believe, needs an excuse for being. So many of its kind exist that there should be good reason why the long-suffering reader should be made to go through so many pages and get so little matter. We confess that we are not much interested in Mr. Seventh or Miss Tenth or Mrs. Fifteenth. We read often of debased characters, bad morals and other Mrs. Grundy appellations without much adequate idea of just what bearing they may have on the analysis of the questions at issue. As a guide-book to a number of specimens it has its advantages, but as a study, in its psychological sense, of the causes of alcoholism, of vice and of insanity, it requires much in order to be of value. For the young who are still collecting data and would know how it should be collected, the volume will be of service and for its straighforward descriptions and homely comparisons it will be interesting.

Lea's Series of Pocket Text-Books. Chemistry and Physics. A Manual for Students and Practitioners. By WALTON MARTIN, PH.B., M.D., Assistant Demonstrator of Anatomy, College of Physicians and Surgeons, Columbia University, New York; Member of Association of American Anatomists, and WILLIAM H. ROCKWELL, JR., M.D., Assistant Demonstrator of Anatomy, College of Physicians and Surgeons, Columbia University, New York; Member of American Association of Anatomists. Illustrated with one hundred and thirty-seven engravings. Lea Brothers & Co., Philadelphia and New York.

IN attempting to condense into a single volume an adequate amount of information on two subjects which even though closely allied are still so broad and comprehensive as chemistry and physics, the authors have certainly shown a most commendable degree of courage and, considering the difficulty of the task before them, one is tempted to be lenient in advance in judging the results of their labors. Even a cursory examination of the book, however, is sufficient to demonstrate that it is of a nature to stand criticism by most rigorous standards and still not be found wanting, for the authors have been fortunate enough to attain conciseness without thereby reducing their work to the syncopated brevity of a quiz-compend, and with admirable judgment the important facts both from a practical and theoretical point of view, have been selected and succinctly presented to the student, while the mass of unimportant and often antiquated detail, classic through its having been handed from text-book to text-book through the decades, has been allowed to fall away as dead matter.

The text is evenly divided between the two topics, 182 pages being devoted to chemistry and 173 to physics. A clear introduction to the principles of organic chemistry and the subject of graphic formulæ takes up 30 pages, a rather small allotment for so intricate a branch of the science, but complete and useful as far as it goes. The abundance of chemical formulæ that are given in full is likely to be of especial value to the beginner, while the complete lists of compounds and their synonyms under each metal should make it a useful book for ready reference.

In the section devoted to physics the same plan is followed of discussing only the more significant topics and these as concisely as is compatible with lucidity, the illustrations, although most of them are old friends to readers in the science, are copious and well selected. Altogether the little volume deserves only praise and is well worth a place in the carefully edited series of which it forms a part, and with the other members of which it is uniform in binding and price.

THERAPEUTIC HINTS.

Tuberculous Peritonitis in Children.—A careful diet should be maintained, raw meat being a desirable item, also milk, unless diarrhea is present. Iron and quinine should be administered, and, possibly, laparotomy be performed, removing the ascitic fluid. For diarrhea the following formula is helpful:

℞ Quininæ tannat.....gr. viii—xvi
Pulv. ipec. et opii.....gr. v—viii
Sacchari alb.....3 iss.

M. Ft. chart. No. X. Sig. One powder three times a day.

Or tannigen may be prescribed, one-half grain every two or three hours.

Mouth-wash and Gargle in Secondary Syphilis.—If the mouth is very sore, only the blandest type of a wash can be tolerated, such as thin flaxseed tea or gum acacia water. If more pronounced medication is possible, one of the following formulæ will be found useful:

1. ℞ Potassii chlorat.....3i
Mellis desp.....ʒss
Tinct. myrrhæ.....ʒss
Aq. dest.....ʒi.

M. Sig. A teaspoonful in a glass of water as gargle and mouth-wash.

2. ℞ Potassii chlorat.....3i
Aq. menth. piper.....ʒvi.

M. Sig. Dilute slightly as gargle, etc.

3. ℞ Ac. carbolici.....3i
Tinct. iodi.....ʒss
Glycerini.....ʒss
Spts. vini rect.....3ii
Aq. dest.....ʒi.

M. Sig. External use. Fifteen to twenty drops in a glass of water as gargle, etc.—*v. Schrötter.*